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HENRY W. BLAKE and HARRY L. BROWN, *Editors*

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The Cedar Point Convention of the C.E.R.A.

THE climax of the Cedar Point convention of the Central Electric Railway Association last week came in the final session on Friday morning when E. F. Wickwire made his address. His subject was "Co-operation of Manufacturers," but his address was far more comprehensive, for he outlined a plan of united action for the entire electric railway industry, both railways and manufacturers, that is not only practical, but whose consummation would soon have a profound effect in establishing a sympathetic understanding on the part of the public. Such a combination of all the electric railway interests, national, state and community, is not impossible, and in united effort it would represent a force of public opinion that must be reckoned with.

Another valuable suggestion in Mr. Wickwire's address, which is printed on page 138, is his scheme for changing the popular conception of the man who represents the electric railway, by picturing broadcast a pleasant-faced man in overalls. In these days of regulation, if not before, this is a true characterization of "Mr. Electric Railway"—a workingman, giving an honest day's service for a fair living wage. That is all he gets.

While of the usual high order of value and interest, this C.E.R.A. convention was disappointing in one feature. The reports made by the Engineering Council did not show the accomplishment that it seemed fair to expect. The three principal committee reports, published on page 146, were expected to crystallize out of the various round-table discussions of the sectional groups, some very definite recommendations as to best practices and as to standardization. However, very little progress in these directions is discernible, and much of the matter contained in the reports is common knowledge. Of course, the functioning of the Engineering Council is still in the experimental stage, but the results thus far show clearly the need for more definiteness of procedure.

It is unquestionably a fine thing for the track, line, power and equipment men to meet and have these round-table exchanges of experience. But if these meetings are not going to get anywhere, the value of the discussions and the interest will rapidly disappear. Thus far there has been a notable tendency to cover the same old ground in the discussions without bringing out of it some definite conclusion or consensus of opinion.

Perhaps the remedy lies in having some executive, who is an engineer by training and experience, sit in the sectional meetings and act as sponsor, with the duty of bringing the discussions down to definite conclusions. In other words, this would be a plan similar to that now followed with each committee of the national railway associations, which is sponsored by a member of the executive committee of the association. The opportunity to do a most valuable piece of work in standardizing practices and equipment among the many interconnecting interurban systems of the C.E.R.A. territory is so great that it is to be hoped that the matter will be given the study it merits, looking toward a plan that will bring accomplishment.

The Air Brake Is a Vital Auxiliary

THE discussion which has gone on for years regarding the relative merits of different methods of emergency braking led the Central Electric Railway Association to undertake a series of tests, the results of which are described in this week's issue. The committee concludes that while there is no one best way to stop a car in an emergency, it may be said that the best practice for a car equipped with air brakes is to apply emergency air and sand, simultaneously throwing the controller to the off position. While this result is not unexpected by those who have made a serious study of the problem, it serves to refute the statements frequently made that reversal of the motors or dynamic braking is preferable in an emergency, or that a motorman did not do all in his power to stop the car if he did not use electrical braking.

The greatest braking force that can be used on a car is that which will just fail to lock the wheels. With excellent track conditions this results in a retardation somewhere in the neighborhood of 4.5 to 5 m.p.h. per second. In the tests, especially those on the Birney car, this figure was very closely approached.

It is significant that in general the average rate of retardation secured was greater with emergency application of air than with the electrical methods. Probably a considerable amount of this was due to the psychological factor, the men being trained so that almost by instinct power is thrown off and the emergency air applied when danger occurs.

One of the great difficulties with the electrical method of braking is that if sufficient force is used to make a rapid stop there is danger of a closely set circuit breaker blowing out, which of course removes all the braking force and allows the car to move without restriction. Both this and dynamic braking, in which the motors are used as generators, place severe strains on the electrical equipment, and sometimes results in burned out windings or connections serving to remove the braking effort. In the test, as is to be expected, these methods, were found more erratic than air.

The real value of electrical methods of braking is in case anything happens to the air brakes so that they are inoperative. It is, of course, comforting to know that an auxiliary brake exists which can be called on in such cases, even though it is not as effieient as the regular air brake. For this reason it is well not to be-

little this form of braking, though the air should be relied on as long as it is in working condition.

Since these tests were made very largely for use in court cases, in which the distance to stop a car is called into question, particular attention should be paid to the fact that the rail conditions under which they were made were better than those frequently obtained on busy streets. The rails were either clean and dry or else thoroughly wet, both of which conditions make for a shorter stopping distance than when a thin film of moisture or vegetation or a light fall of snow is on the rail head. For this reason the results of the tests should be regarded as minimum distances, rather than the average or maximum, in which a car can be stopped. Under commonly met conditions the distance a car will travel after the brakes are applied is considerably more than those recorded in the tests.

Zoning Laws Aid Transit Operation

ONE of the most serious problems in our large cities today is that of traffic congestion. Electric railways are hampered not only by the vehicular congestion in the streets but also by extreme concentration of traffic on their own lines in certain localities. Usually such troubles are the result of imperfections in the original layout of the city. After congestion has developed it is too late to make over the street plan. Zoning laws, however, are being recognized as an extremely useful method of localizing the evils of imperfect planning and preventing their recurrence in new places.

Zoning laws should have the hearty indorsement of the electric railway industry. They make possible a reasonable forecast concerning the future development of various sections of the community. They permit the railway to plan today to meet to-morrow's needs. They prevent sudden and unexpected changes in the character of service demanded by a particular locality.

If zoning is done in time the various streets are used in the way for which they were laid out. By establishing permanently the character of different sections of the city, narrow streets designed for light traffic are prevented from being choked with the greater volume of traffic which might accompany the change from a residential to a commercial neighborhood.

Changes Needed in Rules for Formulating Standards

THE efforts of the American Electric Railway Engineering Association are constantly directed toward standardization. The work is assuming larger proportions through the activities of the association in connection with its status as a member body of the American Engineering Standards Committee. There must soon be a distinct change in the work of the association in regard to its methods of creating standards because the A.E.S.C. rules of procedure must now be followed if national standardization is desired.

The A.E.S.C. has decided that no subject matter may be presented for standardization after Jan. 1, 1924, under Rule 4, which permits the submission of matter already adopted by the member bodies or in process up to Jan. 1, 1920. After Jan 1, 1924, it will be necessary to request the formation of sectional committees in the A.E.S.C. to secure the broad degree of standardization which A.E.S.C. approval gives.

To the Engineering Association this means that any standard which involves manufacturers and other associations and interests as possible users can no longer be assigned to some standing committee for sole preparation. Standing committees henceforth will probably assume the nature of advisory committees which will function by collecting data and conferring with the association representatives on the several A.E.S.C. sectional committees.

Just how to co-ordinate this work on the new lines will require careful study, in order that initiative may not be stifled, that accuracy may be maintained and that the required actions may be speeded up. The present routine of assignment of subjects by the executive committee to standing committees; study and final report of the standing committees; reference to and study by the committee on standards; reports to convention by both standing and standards committees; and convention debate and action, altogether requires from one to three or more years. It is clearly impracticable to hold to all of this procedure if ever the subjects in hand are to get to and through the A.E.S.C. sectional committee grist mill.

Other member bodies of the A.E.S.C. are, no doubt, facing the same problem. An inquiry as to how they are trying to meet it might serve to guide in the formulation of new rules of procedure within the Engineering Association.

Politics Versus Efficiency

THE summary dismissal of a prominent and experienced engineer from his position as head of the United States Reclamation Service and the appointment in his stead of a combination grocer, banker and politician is an occurrence which technical men view with dismay and indignation. To turn out of office, after thirty years of faithful government service, such a man as Arthur P. Davis, a past-president of the American Society of Civil Engineers, would be regrettable enough at best, but the manner in which it was accomplished and the strange qualifications possessed by his successor throw an even darker cloud over the whole affair.

The position of director of the Reclamation Service was protected by the civil service law. In order to effect this change it was necessary to abolish the position which Mr. Davis held and to create an entirely new position. This in itself was a gross violation of the spirit of the law, if not of its letter.

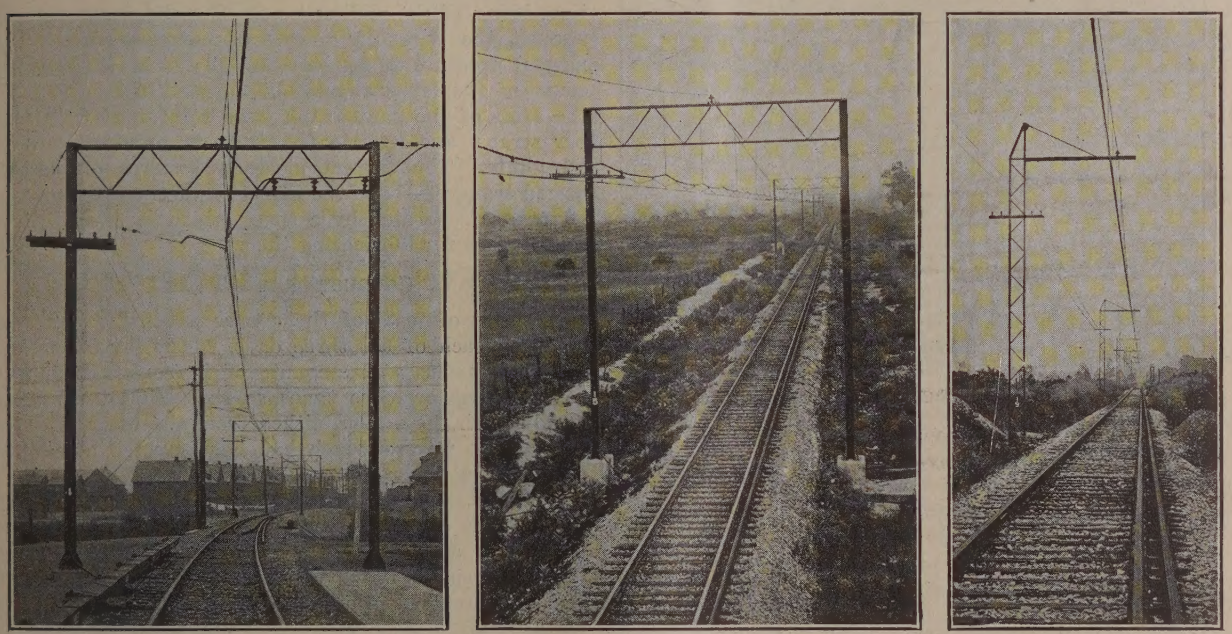
The arguments presented in favor of a business man, rather than an engineer, for the head of this service are wholly specious. Efficient direction is what is needed in the government service, rather than salesmanship or a shrewd ability to juggle profits and losses. For such work an administrator is wanted more than a so-called business man. The engineer who possesses the happy faculty of handling men as well as broad technical knowledge makes an ideal administrator. Proof of this may be found in the increasing number of engineers selected to fill administrative positions.

In no other field is this more true than in the railway industry. Railway men will surely sympathize therefore with the efforts of the American Society of Civil Engineers and the Federated American Engineering Societies to have the whole situation thoroughly investigated. Every detail of this unpleasant affair should be brought out into full daylight.

Collecting 5,400 Amp. at 58 M.P.H.

In Recent Tests at Erie a New Form of Overhead Trolley Suspension Is Tried—With a Pantograph Collector Large Amounts of Current Are Drawn Without Difficulty—New Type Is a Modification of the Usual Catenary Construction

TO SECURE information as to the amount of current that can be collected successfully from an overhead trolley wire, the General Electric Company has been carrying on an elaborate series of tests on its experimental track at Erie, Pa. The construction work involved the erection and test of various types of contact wires and suspension, culminating in the selection of the compound catenary with a so-called laced suspension of the contact wire. A public demonstration and test of this latter type was held July 16, 17 and 18, as described in this paper in the issue of July 21. The present article describes in more detail the engineering features of the installation.



Left, Curve Construction, Supported from Lattice Column Bridges. Center, Tangent Construction Supported from Solid Column Bridges. Right, Latticed Side Bracket Construction on Tangent

For the successful collection of current from an overhead wire it is essential that the contact or contacts between the working conductor and the collector be maintained at all times. Any irregularity in the contact that may cause visible arcing must be avoided. Arcing is a much greater factor in the deterioration of the contact wire than is mechanical wear due to the sliding friction. The aim in designing the overhead construction has been to comply with this essential, and the demonstration has shown the possibility of collecting sufficient current to handle the heaviest trains, even at moderate contact-line voltages.

TEST TRACK DESIGNED FOR HIGH SPEED

For testing locomotives the General Electric Company makes use of the eastern division of the East Erie Commercial Railroad, a subsidiary. That portion of the track which is used for testing purposes is at present 2¾ miles in length, while an extension now under construction will give a total length of 4¼ miles. The portion used for high-speed running is about 2½ miles long, the remainder being required for slowing down the train. Included in the high-speed section is about 1 mile of level tangent track, beyond which there is a slightly ascending grade with curves of from 1 to 1½ deg. The rails weigh 100 lb. per yard, being laid on wood ties with 24 in. spacing and placed in broken stone or slag ballast. The track was carefully aligned and tamped preparatory to the series of tests and gave extremely smooth riding conditions.

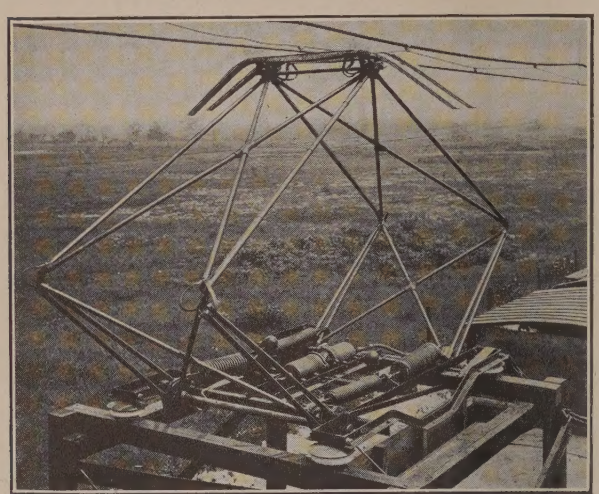
The supporting structures are of various types to illustrate different methods of construction. Beginning about 600 ft. west of the substation near the west end of the test track, and from which the line is supplied, the first thirteen bridges are of the latticed column type, while bridges 14 to 18 are Bethlehem column bridges. The structures from No. 19 to No. 23 are latticed channel bracket poles; No. 24 to No. 28, 10-in. Bethlehem bracket poles; No. 29 to No. 33, 9-in. Bethlehem bracket poles. The last structure, No. 34, is a latticed column bridge used for an anchor. The spacing of the supports is 300 ft. throughout. Several types of structure are shown in the illustrations. All of the steel structural work was supplied by the Archbold-Brady Company.

The overhead construction is of the compound catenary type, having a steel messenger from which are hung a feeder messenger and the contact wires. For the entire length of the test section the steel messenger is a ⅝-in., seven-strand high-strength steel cable. The feeder cable is suspended from it by vertical hangers

of proper lengths to keep the points of support of the feeder in a horizontal plane. The form of hangers to be used has not been finally determined at yet. For the greater portion of the line the suspension was made with plain wire hangers, twisted about the messenger and the feeder. A short section was fitted with hangers made of copper tubing, flattened at the ends and bent over the cables, being held in position with bolts.

The feeder messenger for the first 4,500 ft. from the substation is a 1,000,000-circ.mil stranded copper cable and for the remainder of the line a 750,000-circ.mil copper cable.

The contact conductors are located 22 ft. above the rail. Except for a short section, between bridges 16



View of Pantograph and Method of Suspension of Contact Line

and 20, the contact line consists of two No. 0000 grooved hard-drawn copper trolley wires hanging side by side. The short section has two No. 000000 copper wires, being the same in all other respects. The two wires are allowed to hang freely, and touch at all points.

The two contact wires are hung from the feeder messenger by means of a stranded copper cable, size 0, which is laced back and forth between the feeder and alternate trolley wires. The construction is shown in the illustrations, although the proximity of the two contact wires makes it somewhat difficult to distinguish between them. The lacing cable is fastened by a clip to the feeder messenger, then at a point 5 ft. away to one of the contact wires, then 5 ft. farther along to the feeder, 5 ft. beyond that to the other contact wire, and so on. This makes a 20-ft. spacing between clips on each wire. The lacing cable is given such a tension that the contact wires are approximately 6 in. below the feeder messenger. This requires an over-run of but 5 ft. of lacing for each 1,000 ft. of line.

By means of this form of suspension each clip on a contact wire is opposite the center of the free span for the other contact wire, which is slightly below, due to the sag. It is this arrangement that has eliminated hard spots in the contact line.

In order to test the effect of spacing of the clips, some of the sections of the contact line are supported at 15-ft. points instead of 20 ft. The difference in operation has not been found noticeable.

The accompanying table gives the calculated weights and resistances for several sizes of feeder messenger.

For the current-collection tests a train was made up with a 110-ton gearless locomotive arranged for operation on 750 or 1,500 volts. The locomotive is equipped with four bipolar gearless motors and is capable of speeds up to 90 m.p.h. Behind this was a gondola in which were installed sufficient grid resistors to draw the current for the tests. By remote-controlled contactors, sections of these resistors could be inserted or removed to adjust the current to the value called for in each particular test. The gondola was followed by a coach, in which were fitted instruments for indicating the speed and the current being drawn from the trolley wire.

Normally current is taken through one pantograph of the General Electric Company's type 501. For the tests it was desired to use two pantographs, and on account of the short length of the locomotive cab, the second one was mounted on the gondola car to simulate operating conditions.

The pantographs are practically the same as those used on the Chicago, Milwaukee & St. Paul electrification, being of the sliding type. The slider pan is held against the wires by means of compressed air, the normal pressure being between 30 and 35 lb. On account of the large amount of current to be collected, the arms of the pantograph were reinforced with copper straps, and flexible shunts were provided around all joints. The contact pieces are strips of copper, placed transversely to the direction of travel. The two strips are separated by a space which is filled with a solid grease for lubricating the wire.

CONDUCT OF THE TESTS

A series of tests of the overhead construction was made on each of the three days, consisting of several different speeds and amounts of current. Each was repeated one or more times so that all the observers could watch the action, either from the train or from observation towers which had been erected at several points along the route.

The first test was made to collect 4,000 amp. from a 1,500-volt circuit at speeds of 50 to 60 m.p.h. The train was accelerated as rapidly as possible to the maximum speed, which was from 56 to 58 m.p.h., and the load applied through the grids. The second test was similar, except that the voltage was reduced to about 850. The purpose of this was to show that the difference in the contact line potential had no effect on the current collection.

The third and fourth tests were made at 5,000 amp. at 30 m.p.h and 60 m.p.h. respectively, with two pantographs. Owing to the limited capacity of the power plant and substation these high-current tests were confined to 850 volts.

Following the completion of these four tests, a fifth one was run to collect 5,000 amp. with one pantograph at speeds up to 60 m.p.h. The current actually varied

CALCULATED DATA ON THE SEVERAL SIZES OF LACED SUSPENSION

WEIGHT AND RESISTANCE PER 1,000 FT. WITH TWO NO. 0000 COPPER CONTACT WIRES AND NO. 0 LACING*

Area in Circ. mils			Resistance in Ohms at
Feeder Messenger	Total	Weight	50 deg. C. (122 deg. F.)
1,000,000	1,528,735	4,706 lb.	0.00752
750,000	1,278,735	3,931 lb.	0.00899
300,000	828,735	2,532 lb.	0.0139
4/0	740,335	2,259 lb.	0.0155

WEIGHT AND RESISTANCE PER 1,000 FT. WITH TWO NO. 000000 COPPER CONTACT WIRES AND NO. 0 LACING*

1,000,000	1,964,735	5,426 lb.	0.00587

* 5-ft. over-run of lacing per 1,000 ft.

between 5,200 and 5,400, the maximum speed recorded being 58 m.p.h.

In all the tests the feature remarked on was the ease of collection and absence of any sparking or flashing at the contact. In the entire series but two or three small arcs were observed. The general appearance seemed to be that the pressure of the pantograph was sufficient to lift the contact wires from their normal position some 3 in., the wires appearing to move up and down in a wave as the contact passed beneath. This was made possible by the flexibility of the lacing cable. In this way there was no opportunity for the pantograph to leave the wire. It seemed to make practically no difference whether the power was supplied at 850 or 1,500 volts, and the collection was about equally good at all speeds.

According to statements made by the engineers, 1,500 amp. at 3,000 volts is representative of a 7,000-ton freight train at 40 m.p.h. on level track. The current with such a train would range between 1,500 and 3,000, depending on the grade and the acceleration. The Chicago, Milwaukee & St. Paul freight locomotives are rated at 840 amp. continuously, and the current at the maximum tractive effort with 25 per cent adhesion is 1,200 amp. At its continuous rating this locomotive would haul 12,000 tons on the level at 15 m.p.h.

A 1,500-ton passenger train at 70 m.p.h. would take representative currents of 1,200 amp., increasing possibly to 4,000 amp. with the locomotive starting at 25 per cent tractive coefficient. It is believed by the company's engineers, as the result of the tests, that one pantograph is adequate for service where the maximum current requirement per locomotive is not in excess of 4,000 amp., and that two pantographs will take care of a maximum requirement up to 6,000 amp. The reason for the lower relative rating with two pantographs is that it seldom is possible to divide the current evenly between two collectors.

It was stated that the new suspension should apply equally well for alternating current as it did in the tests with direct current. This would remove any limitation as to contact line voltage, since if the arcing is eliminated the one great cause of trolley wire wear is absent.

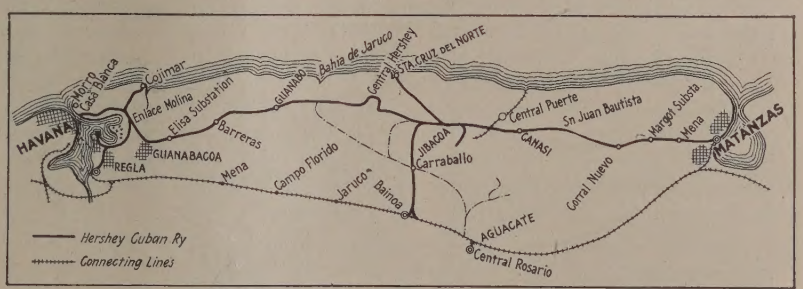
The tests were made under the general supervision of W. B. Potter, traction engineer. J. J. Linebaugh was in charge of the construction and the actual conduct of the tests.

Electric Railway Construction and Operation in Cuba—I

How and Why the Hershey-Cuban Electric Railway Was Built—Some of the Electrical Difficulties Caused by the Moist, Warm Tropical Climate and How They Were Overcome

By L. Geenens
Chief Electrical Engineer Hershey Cuban Railway

AS A large user of sugar for the manufacture of chocolate, the Hershey Chocolate Corporation of Hershey, Pa., decided some years ago to build its own sugar mill in Cuba. A site, later known as Central Hershey, was selected on the north coast, half way between the ports of Havana and Matanzas, some 60 miles apart.

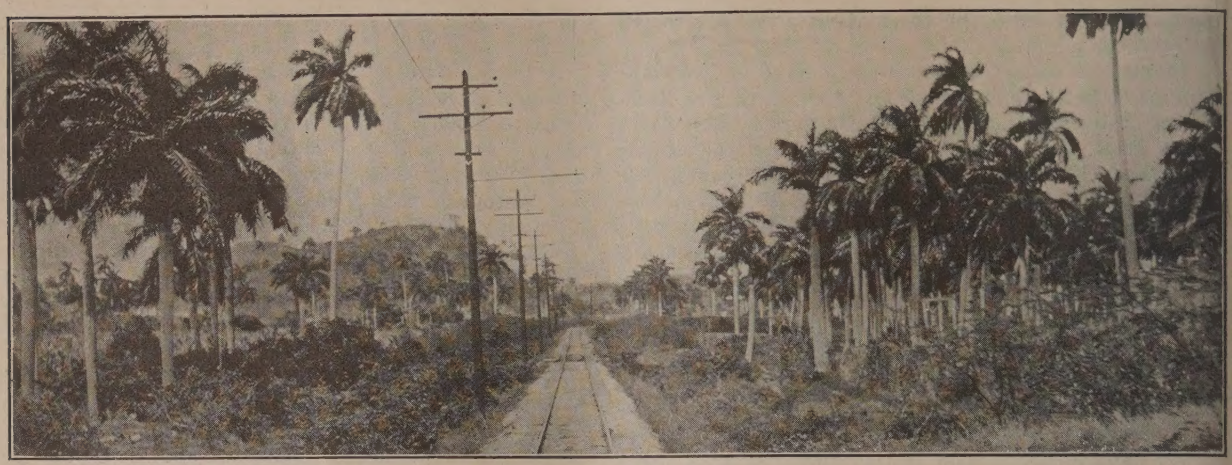


Map of Hershey-Cuban Railway

Successful sugar mill operation requires an appropriate network of railroad lines to convey the sugar cane from the fields to the mill and move the finished sugar to the waterfront. These lines are usually owned and operated by the sugar mill and are not in public service. They are operated during the six months of crop only. The Hershey railroad system, however, was developed on the principle that it should be a self-supporting enterprise instead of being merely an accessory to the sugar manufacture. By extending the line to Havana and Matanzas an all-year passenger and freight service could be established in addition to the sugar mill service.

A part of the road was built first to transport the construction materials for the sugar mill, which was completed in 1918. The remainder of the line was laid immediately afterward. The line passes through a hilly country, necessitating a considerable number of grades. This circumstance, together with the possibility of establishing a high-speed interurban service, led to the electrification of the line. This work was carried on together with the track laying and ballasting. The line was officially opened and electrically operated between Havana and Matanzas on Oct. 5, 1922.

A map of the road, which is known as the Hershey Cuban Railway, is published on this page. The length of main line from Casa Blanca, across the bay from Havana, to Matanzas is 56 miles (90 km.). There are also four branches with an aggregate length of 21 miles (54 km.). The center of operation is at Central Hershey, where is located the sugar mill of the Hershey corporation, the power plant, railway shops, offices, etc.

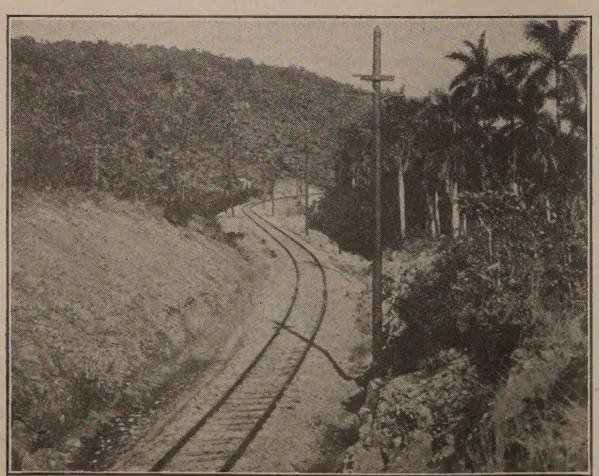


This Line Is Equipped with a 1,200-Volt Catenary, and Though Built Primarily to Haul Sugar Cane to the Mill to Be Crushed and Then to Haul Sugar to the Waterfront, It Is Doing an Increasing Business in Passengers and General Freight

The power plant was built in 1920 and started service in February, 1921. It is located alongside the sugar mill, and the new buildings were given the same architectural treatment. The boiler house is in a separate building from the turbine house. Both are steel structures with red cement tile roofing and plastered walls. On account of the tropical location special attention was paid to the ventilation of the buildings. Both have monitor roofs with continuous sash, top hung, extending the whole length of the monitors. The engine room has five rows of top hung sash windows extending all around the building. The boiler room is open on all sides.

The turbine building is 116 ft. x 40 ft. and the boiler house is 14 ft. x 70 ft. The 200-ft. brick chimney is located between the two buildings. At the present time Mexican crude oil is being burned, but the boiler room has been designed to provide for changing to coal should this be desired.

The plant has at present a generating capacity of 6,000 kw. at 0.8 power factor, 2,300 volts, three phase, 60 cycles in three General Electric turbo-alternators of 2,000 kw. each. Steam is generated at 250 lb. with from 150 to 200 deg. F. superheat in four oil-fired water-tube boilers of 500 hp. each. The air for the generators is taken from inside the turbine room and is washed before it enters the generators. The hot air is discharged outside through an underground tunnel.



In Many Places the Road Passes Through a Tropical Forest

The auxiliaries of the turbines are electrically driven, each unit being provided with a motor-driven circulation water pump, hot well pump and air washer spray pump. The power for these auxiliaries is obtained from the main busbar through step-down transformers at 440 volts, three phase. These transformers also supply power for the house pump, crane, etc. The circulation water for the condensers is cooled in a spray cooling pond.

The 2,300-volt, three-phase bus voltage is stepped up to 33,000 volts for transmission by means of two banks of outdoor transformers of 3,000 kva. each. These transformers are single phase, oil cooled and are provided with radiators. The high-tension bus and oil switches controlling the two outgoing transmission lines are located in a separate room back of the main switchboard on the turbine floor.

An electrical connection of 300 kw. exists between the railway power plant and the power plant of the sugar mill. This current is used outside of the grinding season to operate the cranes, elevators, etc., and also, during the season, on non-grinding days.

The average kilowatt-hours generated per gallon of fuel oil over a period of two years has been 5.2 kw.-hr. as registered on the meters at the busbars. As the load increases, the kilowatt-hours per gallon also increase, and the daily average reaches as high as 5.6 and 5.8 kw.-hr. per gallon with heavy loads. There is a noted difference in the quality of oil between one tank and another and in an exceptional case 6.2 kw.-hr. per gallon was obtained.

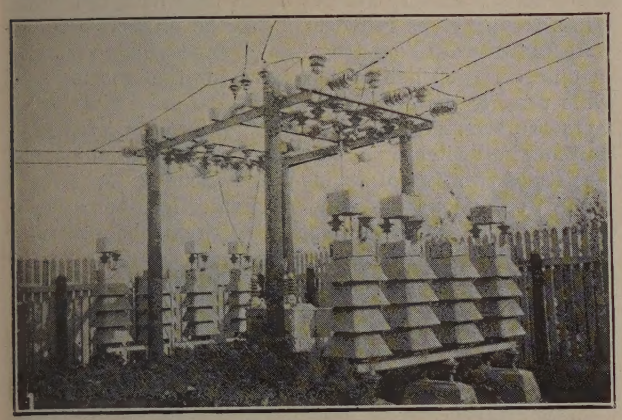
The main railway substation is located at one end of the turbine floor, and includes duplicate sets of two 600-volt, 500-kw. rotary converters connected in series for 1,200 volts. The corresponding switchboard with the air circuit breakers is installed in line with the main switchboard. One switchboard operator takes care of both the main board and the substation. The transformers for the rotaries are located below the rotaries on the ground floor inside concrete compartments separated from the plant by means of steel rolling doors. From each compartment a chimney extends to the top of the building for ventilation. There are two full automatic substations of 1,000 kw. each.

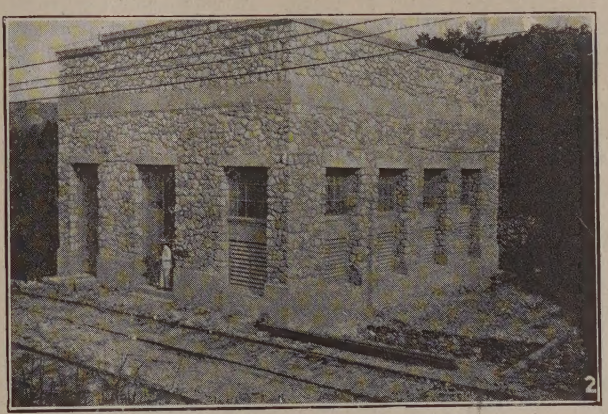
The contact wire consists of a No. 0000 grooved copper trolley wire suspended from a ten-point catenary on 150-ft. spans. The messenger is a $\frac{7}{16}$-in. Siemens-Martin seven-wire strand double-galvanized cable.

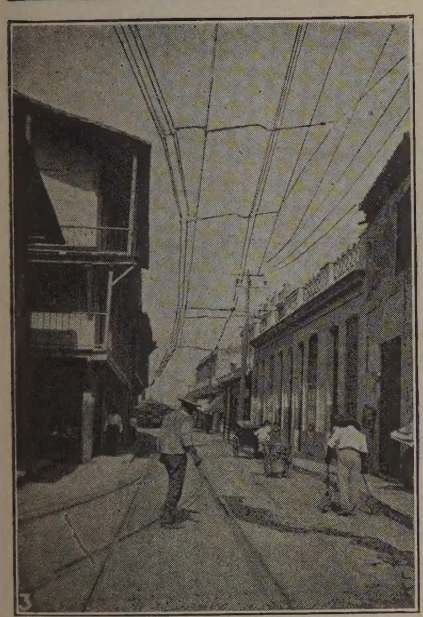
There are no splices in the trolley wire, the ends being dead ended at the mast arms. The galvanized T-iron mast arms are supported from 45-ft. creosoted poles which also carry the feeders and transmission lines.

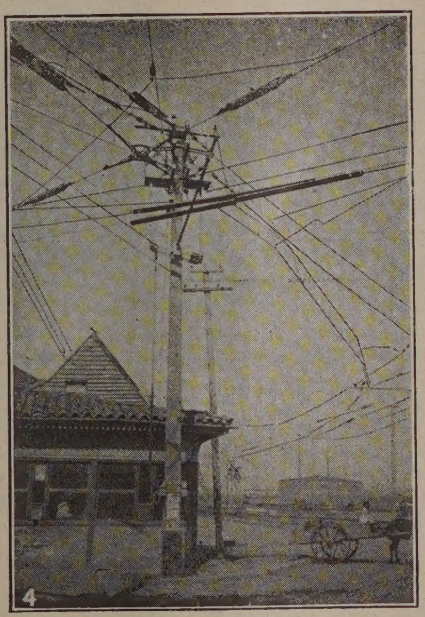
The overhead covers a total of 100 miles (160 km.) of track with 56 miles (90 km.) of main line.

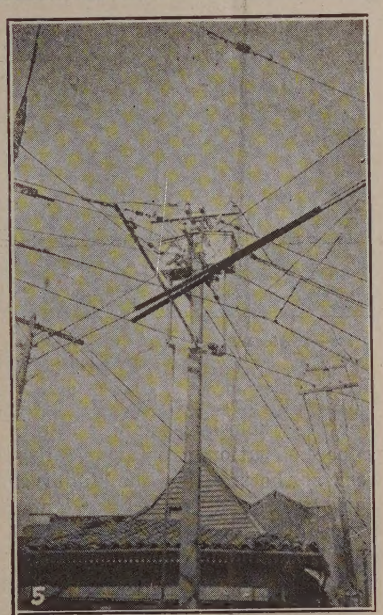
An all-aluminum stranded feeder of 795,000 circ.mils extends the whole length of the line with an additional feeder of the same section extending for 8 miles each way from the main substation, this section containing heavy grades and being the concentration point of all











Power for the Hershey Cuban Railway Is Supplied to the Trolley at 1,200 Volts

No. 1—33,000-volt outdoor metering station with short-circuiting switches to disconnect the meter without interrupting the service.

No. 2—Automatic substation at Margot, with a capacity of 1,000 kw.

No. 3—A typical narrow street in Casa Blanca.

Nos. 4 and 5—The switching device at Matanzas, where the 1,200-volt line crosses two tracks of a street railway equipped with 600 volts.

sugar cane trains. The feeders and trolleys are cut at the main substation and enter the 1,200-volt bus through air circuit breakers. Feeders and trolleys are continuous between the main substation and each end of the line, there being no section switches. The automatic substations are tied in the system through current-limiting resistances.

The poles were set at 10 ft. from the center of track to the center of pole, at a depth of 9 ft. below the top of the rail and with a rake of 6 in. in 24 ft.

The digging of holes and also the setting of poles was given out on contracts. A first contract for digging holes was paid at the rate of $4.50 for holes in rock and $2.50 in dirt. Holes with part dirt and part rock were paid for on a percentage of these figures, corresponding to the ratio between the heights occupied in the holes by the respective materials. As the nature of the soil was not well known, this rate of pay protected both parties. Later, however, a uniform price of $3 was established as constituting an average figure resulting from the experience obtained with the first scheme. The company supplied digging tools and tents but no explosives.

The contract for setting poles was let at the rate of $5.65 for 45-ft. poles and $4.90 for 40-ft. poles. In these figures were included the removal of loose dirt in the holes, the setting of poles, installing ground cable every fifth pole, installing three crossarms with braces and pins at each pole but without tightening the bolts nor installing the lag screws of the braces at the pole. The latter adjustments were done later by the company's line crew. The contractor and his crew, all of whom were colored of British origin, were left free to follow the method of erection which suited them best and they received all possible assistance from the railway representatives. A light-weight wooden A-frame was used with an extension on the top and properly

guyed with ropes. A 1-in. rope double blocked was hitched to a team of bulls and these were made to lift the poles. A crew of ten men would erect from six to eight poles per day. This work was carried on in 1919 and 1920, a time during which a severe labor shortage was experienced. It was completed during 1922, when conditions were more favorable, and a contract price of $5.50 was obtained covering both the digging of the hole and the setting of the pole.

The erection of the overhead lines was done by the company itself, as no competent contractor could be found for this kind of work. It was soon apparent that British colored labor from Jamaica and other British possessions was best suited for this work. They are steady workers, are good climbers, like good food and thus are physically fit to render such heavy work under a tropical climate. Some of these men had acquired knowledge of line work at the Panama Canal, others were trained by the superintendent in charge of lines. A crew of nineteen men including a cook was lodged in sugar cane cars which had been properly boarded up and divided into rooms. A floor was built over the whole length and width of each car and at the proper elevation from the rails to allow linemen to work at the trolley while standing on this floor. These platforms were very convenient for all trolley work. When installing the hangers of the catenary, the whole camp was pulled out and constituted a continuous platform extending over more than one span. The crew was distributed along this platform at 15 ft. apart, and the ten hangers of the span were installed at the same time and with only one stop of the locomotive.

A reel car for eleven reels was made in the shops and used to pay out all the conductors. The No. 0 aluminum transmission cable and the 750,000-circ.mil aluminum feeders were paid out on the ground along the track and lifted on the poles at the same time that the insulators were installed and the bolts of the crossarms tightened, all this constituting one operation for small gangs composed of two linemen and one ground man.

During rainy days the crew was kept in the camp and made to prepare trolley dead-ends, cement messenger insulators and in general prepare line fixtures.

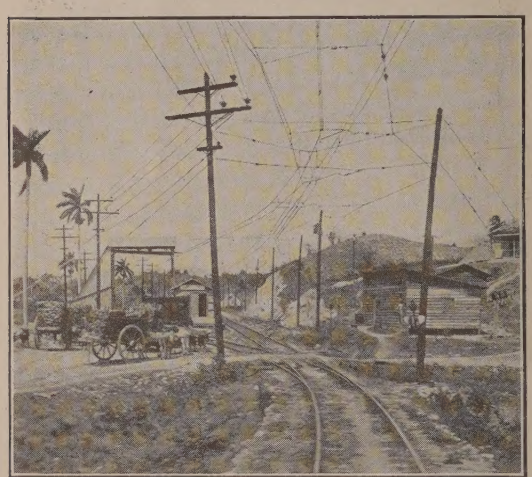
The guy anchors were made up of concrete blocks, 19 in. x 19 in. square, 6 in. thick in the center and 3 in. on the sides. A 1:3:5 mixture was used with ¾-in. stone. Twenty-five concrete poles of 38 ft. and 45 ft. heights were built and installed where city regulations prohibit the use of wooden poles.

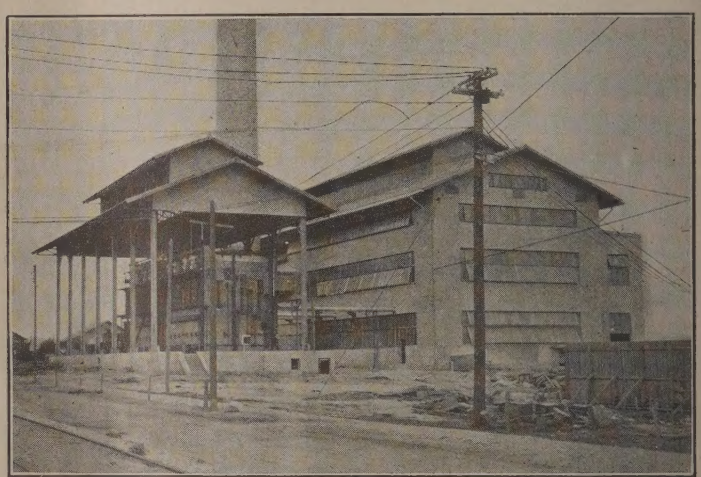
Overhead Crossings with 600-Volt Lines

Two crossings occur between the 1,200-volt catenary of the railway and the 600-volt direct-suspension trolleys of local street railway companies. One is in the city of Matanzas and the other at Regla, a suburb of Havana. In the first case two street railway tracks at 60 ft. apart cross the railway's track in a sharp curve and grade. As heavy freight trains pass here, coasting across could not be relied upon, so the protective zone system of overhead crossing was adopted. This assures an uninterrupted live contact wire for the locomotives while passing the crossings and at the same time prevents the street cars from coasting into the crossing train. The switching outfit was made up locally and consists of two sets of double-pole switches in asbestos-lined wooden boxes and mechanically interlocked through a rocker bracket operated from the ground. The switches are normally set for 600-volt operation over the crossing and are locked in this position by means of a railway switch lock. Train crews throw the switches over to 1,200-volt operation when they approach the crossing. No signals are needed as it is physically impossible to coast through the dead zones because of the existence of sharp curves and grades.

The second crossing between the 1,200-volt catenary and a 600-volt direct suspension was more complicated because of the existence of both a positive and negative trolley wire at 18 in. one from the other. Three such crossings existed at distances of some 150 ft. apart through city blocks and in an unusually narrow street. A switching system with protective zones would not have given the results expected as the street cars were able to coast into the crossing from a long distance back, due to a combination of grades in the streets. As an experiment, a system of overhead crossing pieces was developed locally whereby the two wheel trolleys of the street car pass with an uninterrupted live contact wire while the pantographs slide through the crossing without coming in contact with the 600-volt wire. The 1,200-volt catenary is killed for a distance of 5 ft. each side of the crossing.

The device consists essentially of two wooden troughs containing the wheel trolley wires and a system of





Left—Typical Siding and Cane Loader. Right—Owing to the Tropical Conditions, the Turbine Room Is Provided with More than the Usual Amount of Ventilation, and the Boiler Room Has a Roof with No Sides

hinged wooden flappers which are pushed across the troughs by the pantographs and thus prevent the latter from rising so as to touch the 600-volt wires. The device was made of Cuban hardwood, which resists the climate better than iron and needs no painting.

The 33,000-volt outdoor metering stations, for metering current sold to distributing companies, of which one is shown on page 129, were built on the principle that as little iron as possible should be used and where employed it should be so located that it can be painted without having to kill the station. It should be explained that paint is used because galvanized fixtures show rust within a year and some even get rusty while in transit. Iron exposed to the weather and the salt mists in Cuba has to be painted twice a year.

The meters and lightning arresters were set on the ground on concrete bases. The disconnecting switches and choke coils were installed on timbers which, in turn, are supported from I-beams bolted to four creosoted poles. These timbers are of native Cuban wood called "caoba" and will resist the weather better than the iron and need no painting.

Bonding

Acetylene-welded bonds of No. 0000 B.&S. copper strand were installed on both rails of the main line, while on sidings only one rail was bonded. A competent contractor undertook this work at 95 cents per bond, the railroad supplying him with a powerful motor car for moving his equipment along the track. All expenses of gasoline, acetylene gas, etc., were paid by the contractor. This welding was done during the night, as the extreme heat of the day was a handicap for the welders.

Mexican crude oil was splashed on the bonds while hot for the purpose of discouraging stealing. Only a part of the bonds were so treated, however, as it increased the labor cost materially. Thus far, there has been no stealing of either the treated or untreated bonds. Both rails are grounded at each stream crossed by the railroad in order to eliminate any possibility of potential on these rails.

Overcoming Flashovers on the Transmission Lines

The railway does some commercial light and power business in the localities served by the railway. The power is sold wholesale at 33,000 volts, three-phase, to local distributing companies through high-voltage outdoor meters. The most important of these companies is the Matanzas Public Service Company, operating in the city of Matanzas, at the eastern terminal of the railway.

The transmission lines are carried on the trolley poles and consist of No. 0 aluminum steel-reinforced cable on 150-ft. spans, supported on pin-type insulators with steel pins, wooden crossarms and angle-iron braces. Insulators of 45,000-volt rating were installed.

The experience of other power companies operating high-voltage lines in Cuba had shown that some trouble was to be expected from the presence, during the winter months, of mists entraining a very appreciable amount of salt from the sea. The first line was put under tension in March, 1921, between the power plant and Matanzas. Trouble did not develop, however, until the following fall. On certain nights, insulators located on steel towers near the plant and at the end of the line along the seashore flashed over, tripping the line. On such nights, all the insulators of the line show a corona light between petticoats. When the sun rises, the moisture on the insulators dries and the phenomenon disappears.

An examination of the insulators showed that those located on the steel towers which carry the lines through city streets were heavily coated with dust raised from the street, while the insulators along the right-of-way were fairly clean. An analysis of this coating showed 8 per cent salt by weight. Rain would wash the insulators, but as there is no rain for months at a time, the combination of dust, salt and moisture soon develops into a hard coating which gradually becomes more conductive.

To remove this coating the insulators were first washed at intervals with a solution of caustic soda. This washing was done between 4 and 6 a.m., as this was the only time available. It developed, however, that unless the insulators were wiped dry, flashes would take place as soon as the voltage was re-established. Experience showed that a dry wiping with paper while the insulators were moist was more effective in removing the salt.

This phenomenon disappears in the spring, toward March, and is never noticed during the summer or fall.

To overcome these troubles the insulators were set on wooden crossarms in turn bolted to the steel towers. This was an improvement, but toward the end of the following winter the insulators flashed over again when enough dust and salt had accumulated. The crossarms had also a tendency to burn.

It was then decided to introduce a higher insulation on all steel structures. Hewlett strings of four 15,000-volt disks were installed, and, wherever needed, 60,000-volt pin-type insulators were used. This plan proved entirely successful in eliminating flashovers.

It will be interesting to note that the same 45,000-volt insulators on wooden poles are not flashing over, although some are exposed to the same dust and atmospheric conditions. An extension of the line was built last fall and was carried on steel poles along the bay of Matanzas and thus directly exposed to the salt mists. Strings of four disks with metal caps proved entirely unsatisfactory. All sorts of insulators on hand were tried. Disk insulators without metal caps stood up better than those with such caps, and pin types with many small petticoats proved more satisfactory than when a few large petticoats were used. Where string insulators were maintained, six disks were introduced.

It should be noted that this phenomenon was also felt on the steel towers and outdoor bus structures at the power plant, located 3 miles from shore, showing that this condition is not localized near the sea but penetrates inland for quite a distance. On such nights the air is usually calm. On windy nights it would not take place.

Although the dust accumulating on the petticoats acts as a support for the salt and thus encourages the flashovers, certain cases show that even with a clean insulator a breakdown will take place under severe atmospheric conditions. On several occasions wooden crossarms on steel towers caught fire through leakage over 60,000-volt pin-type insulators, where 1 ft. of crossarm separated the steel pin of the insulator from the tower proper. These insulators were found to be as clean as could be expected anywhere.

During these cases, the other insulators on the tow-

ers show sparks between the lower petticoats and crossarms and sometimes along the crossarms all the way to the towers.

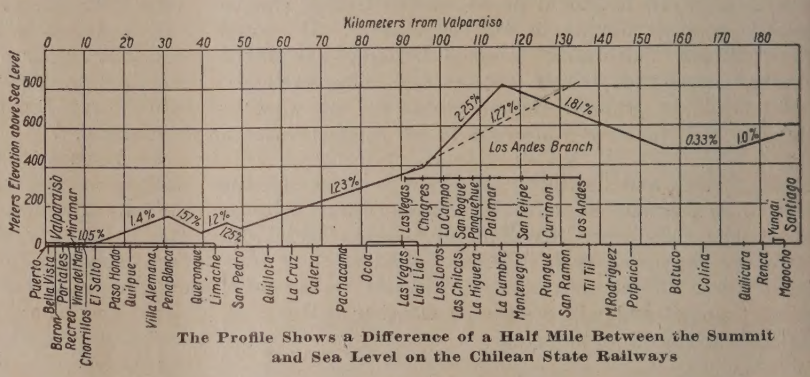
These conditions last for one hour or so in the early evening. During that time a cold mist has been noticed which is carried over from the sea.

The lightning period lasts from April until October and corresponds to the "rainy season" of tropical climates. During this period, there is a lightning storm practically every day around 2 p.m. Certain localities are more exposed to these storms than others. It was observed that some 90 per cent of the storms would occur east of Central Hershey, while very few would occur on the west. There would be more direct strokes on the Bainoa branch and near the Margot substation than on any other part of the line. The hills around the substation may account for this particular exposure.

The transmission lines are protected by means of oxide film arresters and, in addition, there is a ¼-in. steel ground cable over the lines east of Central Hershey, while on the west the ground cable has been omitted. The substations are protected on the trolley side by means of aluminum cell arresters and the electric cars are also protected with arresters of this type.

During the two years of operation, the voltage was never off the transmission line because of lightning troubles, although a considerable number of strain insulators were shattered on the trolley lines located below the transmission. Insulators of pantographs also were blown up, and direct strokes entered the substations and did considerable damage to apparatus. In general, experience has shown that the lightning discharges in this district are violent and very destructive and that the best lightning protection should be applied.

Rolling stock and transportation methods will be treated in the second and final installment of this article.



The Profile Shows a Difference of a Half Mile Between the Summit and Sea Level on the Chilean State Railways

Chile Inaugurates Electric Operation

The President of the Republic, Acting as Engineer, Operates First Train—Report on Status of This Project Brought Up to Date—Details Briefly Reviewed

PRESIDENT ALESSANDRI of Chile occupied the engineer's cab on the first electric train to run from Santiago to Til Til, thus inaugurating electric operation on the Chilean State Railways. The large number of guests who attended the inauguration of electric operation included the Secretaries of the Interior, State and Industry, Railroads, War and Justice, the United States Ambassador, Hon. W. M. Collier; the Colombian Minister, Señor Carlos Uribe; the Director of Railroads, Señor Jaramillo, and other high officials of the railroads, and the engineers from the firms of Errazuriz, Simpson & Company and the Westinghouse Electric & Manufacturing Company.

It will be remembered that this electrification contract, awarded to the Westinghouse Electric & Manufacturing Company, amounted to $7,000,000, and involved the electrification of 144 route-miles, 116 from Valparaiso to Santiago, and 28 in a branch from the main line to Los Andes. Already 90 per cent of the concrete posts are in place, and the majority of the feeder lines and catenary trolley wire is up. About 6,500 posts and 1,200 tons of copper, aluminum and steel cables are required.

There are five substations involved which transform the high-tension, three-phase current from the hydroelectric power plants to 3,000 volts d.c. as used on the locomotives. The two power plants, Maitenes and Florida, are owned by the Compania de Electricidad, Ltd., and are located on the Maipo River. The substations are located at Quilicura, Rungue, Llai Llai, San Pedro, and Vina del Mar. The first and last of these receive 12,000-volt current and the three others 44,000-volt current. Each substation has two 2,000-kw. motor-generator units and is divided into two compartments, one for the transformers and one for the motor-generator sets.

The buildings are entirely of steel and concrete and are completed. The installation of all electrical equipment has been completed at the Quilicura substation, and is rapidly nearing completion in the four others. The line material, transformers and electrical equipment for the substations filled sixty-five railroad cars when shipped from the Westinghouse works and required two steamers to transport from Philadelphia to Valparaiso.

Greeting the First Electric Train on the Chilean State Railway at Til Til

The contract included thirty-nine electric locomotives which will replace more than 100 steam locomotives. There are six express passenger locomotives of 2,250 hp. and weighing approximately 130 tons. They will carry first and second-class cars between Santiago and Valparaiso at a maximum speed of 62.5 m.p.h. These have six motors, are of the 2-6-0+0-6-2 classification and are designed for regenerative braking, which not only provides greater safety on the down grades and saves wear of brakeshoes and wheels, but actually returns energy to the lines. These locomotives have all been delivered and are assembled.

There are fifteen road freight locomotives of 1,680 hp., weighing 115 tons each and developing a speed of 40 m.p.h. These locomotives have six motors and are of the 0-6-0+0-6-0 classification. These locomotives have also been delivered.

There are eleven local passenger locomotives of 1,500 hp. and weighing 80 tons. These will be used in local service with frequent stops and carrying first, second and third-class cars at a maximum speed of 56 m.p.h. These locomotives have four motors, duplicates of those on the express passenger locomotives. They are of the 0-4-0+0-4-0 classification. These locomotives are rapidly nearing completion in the Westinghouse works at East Pittsburgh.

In addition to the passenger engines, there are seven switching locomotives of 480 hp., weighing 67 tons and developing a speed of 34 m.p.h. These locomotives have four motors and steeple type cabs. Some of these are now on the way to Chile, and the balance will soon leave East Pittsburgh.

This Chilean electrification project has been fully covered in earlier articles in ELECTRIC RAILWAY JOURNAL which appeared as follows: Vol. 59, page 151, 309, 667, 988; Vol. 60, page 325.

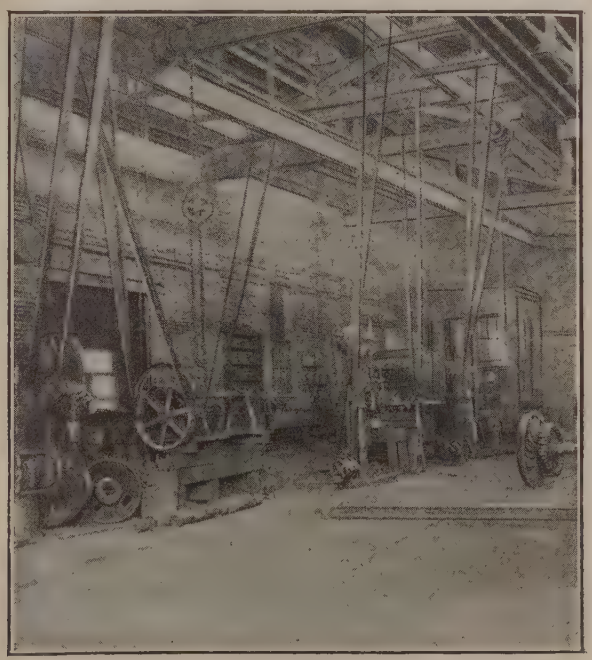
Observations on the Railway Situation in Three Virginia Cities

In Hampton, Newport News and Roanoke the Solution of the Transportation Problem Is Frequent Service—Fares Are Low, but Proximity of Residence and Business Districts Encourages Pedestrian Competition

By "Spectator"

AT THE time I visited Hampton, last month, the Newport News & Hampton Railway, Gas & Electric Company was in the throes of a voluntary valuation which was being made at the suggestion of the state commission. This was to be submitted to the several municipal councils involved and if acceptable will be made the basis of future negotiations. The company was assisted in this work by W. D. Maltbie of Baltimore, but the appraisal was the work of the company's staff. The fare is low, being only 5 cents per zone. There are three zones on the system—Newport News, Hampton and Phoebus and Old Point Comfort.

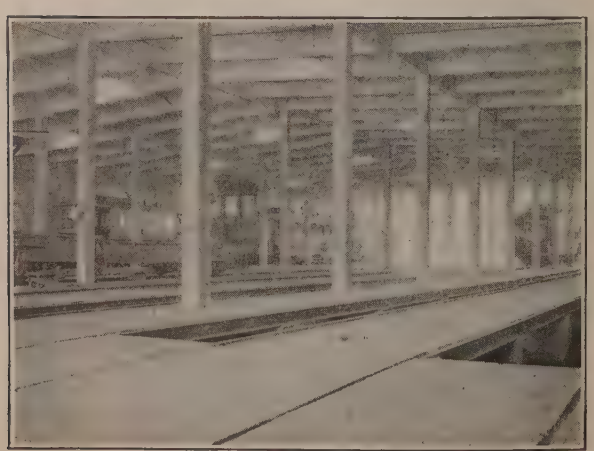
While the fare in each zone is low, by present-day standards, the cities served are of such size that many



Left—Overhauling Work Is Facilitated at Hampton by This Substitute for Pits. Right—Skylights Give the Machine Shop a Cheerful Appearance

Mechanical Devices Are Used to Eliminate Manual Lifting and Carrying in the Hampton Shops

Coal for the Power Plant at Roanoke Is Handled by Means of a Traveling Clamshell Bucket



The Carhouse at Roanoke Is Fireproof and Is Well Provided with Inspection Pits

patrons would walk if it were higher. The same principle applies to the service given, which is more liberal than the traffic warrants, also judged by usual standards. The traffic is unusually sensitive to headway. Fortunately this company has a diversified business which enables it to weather the storms of electric railway tribulation.

The present fare of 5 cents is the result of a recent reduction from 6 cents. The effect of the reduction was increased traffic on some lines much more than sufficient to make up the difference; on other lines this was not so. The net result was a slight reduction in income so far. The ultimate result will be awaited with interest.

I was impressed, at Hampton, by the shop layout and procedure, which for a property of moderate size seemed unusually good. The shops are laid out to facilitate simultaneous work on different parts of a car while it is undergoing overhaul. Cars are completely overhauled after they have made 75,000 miles, or at the rate of two cars per month. Two spare equipments are kept constantly on the floor ready for installation. As a result of close attention to details there were last year only 359 failures of equipment for nearly 1,700,000 car-miles, involving more than 21,000 operations. There were but fourteen armature failures and one field failure. In these shops the moving of heavy objects by manual labor is reduced to a minimum.

Roanoke Also Operates on a 5-Cent Fare

On the way to Bluefield to study the Norfolk & Western electrification, I stopped off at Roanoke, which is the administrative headquarters of the N. & W. I found President N. D. Maher and his associates full of enthusiasm for electric operation and desirous of extending it. An interview with Mr. Maher, published in the July 14 issue of this paper, in my opinion reflects the attitude of the railroad management toward this important development.

The electric railway problem in Roanoke is similar to that at Hampton. The local utility, the Roanoke Railway & Electric Company, is a subsidiary of the American Electric Power Company, formerly the American Railways Company of Philadelphia. As in the case of most combined utilities, the non-railway section of the property has of late years been more profitable than the railway, and it is due in part to this situation that the company has been able to give service at the low fare of 5 cents on the urban lines. J. W. Hancock, general manager, explained that the company is restricted by its franchise to a 5-cent urban fare, but that on the line running from Roanoke to and through Salem (9 miles) there are three 5-cent zones, with ticket fares of 10 and 12½ cents. The company also operates cars from Roanoke to Vinton (3 miles). Another factor which enables the company to maintain a 5-cent fare is that the average length of ride in the municipalities is short.

The company is now building additional passing points on the interurban division. It is getting from another subsidiary company six cars, which are being released there by new cars of lighter weight. These four-motor double-truck cars fit in very well, after some remodeling, with the present equipment at Roanoke. With these additional cars and improved track facilities the company will be in position to cut the headway on the interurban division in half. Getting these cars at a low valuation the local company can

At Left, the Roanoke Power Plant. At Right, a Typical City Car at the Entrance to the Carhouse

furnish the added service without proportionate increase in overhead expenses. While on a large property the addition of a half dozen cars might not seem important, it means an increase of nearly 15 per cent here.

The company is also reconstructing some of its old car equipment for one-man operation.

The management believes that with improved car service between Roanoke and the suburban towns of Salem and Vinton the use of private automobiles will be decreased. Of assistance in this is the difficulty of securing parking places for automobiles in the downtown district, the streets of Roanoke being narrow.

The Readers' Forum

Use of Welding Wire Specificatians Urged

CITY OF DETROIT
DEPARTMENT OF STREET RAILWAYS
DETROIT, MICH., June 25, 1923.

To the Editors:

I was much interested in the editorial on page 992 of the ELECTRIC RAILWAY JOURNAL for June 16, 1923, under the caption "Railways Should Use Welding Wire Specifications Drawn by Welding Society." Would it not be a good idea for the ELECTRIC RAILWAY JOURNAL to publish these specifications in toto, either as an insert or a permanent part of some future issue, in order that they may be more readily available to electric railway users?

Our welding division, particularly in the winter time, does considerable reclamation work for other divisions, such as welding gear cases, making repairs to track machinery, etc. This work covers not only iron and steel but brass, copper and, in one or two instances, we have had occasion to weld aluminum.

It is my opinion that the only way to have these specifications put into practical use is to cram them into the users' heads. While they can be obtained from the American Welding Society at what may be considered a nominal price, still there seems to be no disposition on the part of electric railway users to purchase welding wire according to these specifications. A campaign of education should be taken up in order to create more particular interest.

H. M. GOULD,
Electrical engineer.

[The editors agree with Mr. Gould that the practical use of the welding wire specifications, as published by the American Welding Society, has been neglected by both the electric railway operators and manufacturers. It is hoped that by publishing Mr. Gould's letter attention will be called to the desirability of these specifications, leading to their more general adoption.

There is always great pressure on the columns of this paper for the publication of news and articles relating to electric railway practice. For this reason the editors would prefer, if possible, not to publish the welding specifications in full, believing that the readers would prefer to have that space devoted to material which cannot be obtained elsewhere. The American Welding Society is the logical publisher for welding specifications, and these specifications can be obtained from the society at a nominal price.—EDITORS.]

Electric Door Operating Mechanism

THE West Penn Railways, Connellsville, Pa., being equipped with magnetic brakes, has no compressed air supply on its cars for the operation of auxiliaries. A simple door-operating mechanism has been worked out, which is quite as satisfactory for this company's service as the standard pneumatic control.

Center side doors are employed on the interurban cars. They are of the standard folding type, there being two doors at each side, and each door consists of two leaves, hinged together. The doors on each side of the car are equipped with an independent control. This is accomplished through the use of a small 250-volt electric motor, which moves the doors through a system of spur gearing. The power supply is controlled by small drum controllers, one for each side, located above the conductor's compartment in the middle of the car. These drum controllers may be operated from any position in the car through the use of cords, similar to the bell cord. Should the doors be closed, a pull on one of these cords moves the drum controller, to which it is attached by means of a ratchet, so that the motor is energized and the doors opened. A second pull on the cord will close the doors. The doors on either side of the car may be controlled independently.

The use of this device permits the conductor to move freely through the car, collecting fares or performing other duties, but still having the doors under his control at all times. In this way the car operation is facilitated.

Handles are provided above the doors, so that merely by turning the large gear they may be operated by hand. The operating mechanism is not disturbed by this procedure, so that no complicated connections are needed to provide this emergency feature.

Association News & Discussions

Public Relations and Freight Main Topics at C.E.R.A. Summer Meeting

Three-Day Convention at Cedar Point, Ohio, Has Usual Interest—Engineering Council Reports on Work Done Toward Development of Best Practices—Better Public Understanding of the Railways Was the Keynote of the Convention's Mission

THREE HUNDRED strong, the men of the Central Electric Railway Association and their families gathered at the famous Cedar Point summer resort on Lake Erie for the annual summer convention. While many felt that this was not the equivalent of the usual six-day cruise on the Great Lakes, the land convention was at least a welcome change and every one seemed thoroughly to enjoy the meetings and the recreation. There were five morning and afternoon business sessions on July 18, 19 and 20, with the question of public relations standing out as the predominant interest of the convention. Some time was also devoted to engineering subjects, the Engineering Council having charge of the Thursday afternoon session and making report on the results of its endeavors. Another meeting was largely devoted to the subject of freight traffic.

A dance on Wednesday evening and a banquet on Thursday evening comprised the planned entertainment aside from that afforded by the popular beach and other Cedar Point amusements. At the banquet, J. P. Barnes, president Louisville Railway and president of the association, ably presided, as he did over the business meetings. The principal speaker at the banquet was John B. Maling of New Haven, Ind., whose subject was the "Origin and Effect of Class and Freak Legislation." In a most interesting exposition of facts, he pointed out the great dangers in our present political tendencies and inspired the delegates with the need for every educated citizen to give something of his time and effort in support of the constitution and the fundamentals of our form of government. At this banquet, the delegates were entertained by the Inspectors' Quartet of the Louisville Railway. whose songs were enthusiastically received.

The President's Address

At the first session, on Wednesday morning, President Barnes addressed the convention briefly, as follows:

"Looking over the programs of conventions of railway associations, during several years the predominant note will probably be found to be an ever-increasing emphasis upon the position of the railway as a public servant, accompanied by an increasing breadth of vision as to the real meanings of this public service. Now service is of many kinds and each wears its own and appropriate livery. Mark Twain in the 'Yankee in King Arthur's Court' makes the Yankee complain of the discomfort of his armor. In response King Arthur points out to him that armor is the livery of knightly service and is a proud burden proudly borne. So should the livery of the public servant be proudly worn in the knowledge that our service, well and truly rendered, does indeed make livable the modern city, and that without it the people would perish.

"More and more emphasis is being placed from year to year and from convention to convention on public relations. The importance of frankness and honesty in public relations is no longer a matter of discussion, so obvious has it become and so generally recognized. We have truly reached the day when 'backstairs' are obsolete and our proud being of public service is unashamed to enter by the front door of commission or executive office.

"All of this is neither novel nor unfamiliar to this audience and is mentioned here but as the background for the picture of our industry today. The problems—many of them—of today will be discussed as our program unfolds, and there remains for your presiding officer but one thought to express before we proceed.

"Inward conditions will find reflection in external relations, as truly in corporate as in individual life. Seldom is the dyspeptic individual a pleasant companion, and seldom is the internally sour corporation a pleasant or efficient public servant. I doubt if an unpleasant public servant can be an efficient one, for the delicate adjustment of correct public relations depends largely on the cordial public reactions that arise from pleasure in the service received.

"I doubt, also, whether pleasure can be derived from a service which is not touched with some degree of pleasure in the service itself by the one who renders it. How could you or I, working under conditions of discomfort, restraint and uncertainty, render a service to any person that would be productive of real pleasure to that person? How can any employee of our corporations do that thing?

"Let us look, then, to the adjustment of our internal mechanisms. Let us see that methods and working conditions are not only reasonable but as comfortable as may be. Let us take a real interest and concern in the state of mind of our company's employees. And, let us go to trouble, expense and personal inconvenience, if necessary, to understand the mental and spiritual, as well as the physical, conditions under which our public service is rendered.

"Would we be efficient public servants, let us be pleasant public servants, and let us see to it that each individual on our payrolls gets the vision, so far as we can carry it to him, and reflects in his individual attitude to his labors the attitude of the corporation to its public service—a proud burden proudly borne."

Following the president's address, Secretary L. E. Earlywine made an extended progress report on the various activities of the association. He showed the association to be in a healthy condition financially and that the committee work was well in hand. Among things done by the Central Electric Traffic Association, as noted by the secretary, an item of general interest is the decision that value of excess baggage carried will be limited to $500 for any individual. Another item was the conclusion reached by a vote of eighteen lines for and eight opposed, that the present per diem charges for freight equipment on interchange, of $1 a day for the first seven days and $2 a day thereafter, should be increased to $5 a day after five days.

Progress reports were made by James Harmon for the safety committee, John S. Bleecker for the publicity committee, and M. B. Lambert for the supply men's committee.

Discussion on Freight Possibilities

That the future success of the interurban lies in the further development of the freight business was the opinion of T. H. Stoffel, whose paper on this subject appears elsewhere in this issue. That it is a profitable venture for the interurban railways was largely concurred in by those who discussed the paper.

J. S. Bleecker raised some questions as to the proper method of allocating expenditures between freight and passenger service, which induced considerable discussion, the gist of which was that regardless of the accounting details as to the manner of distributing expenses, if the final result shows a net earning larger than without the freight business, then the freight business is profitable. It was brought out, however, that there must be a reasonably accurate allocation of expense, in order

that it may be possible to avoid taking classes of business which are unprofitable.

Attention was called to the standard allocation recommended by the American Electric Railway Accountants' Association, which makes the division on a mileage basis as to fixed charges and divides employees' salaries in proportion to the time actually spent in each branch of the service. It was thought that although the freight business could be classed as a by-product at the start, after it reaches the point that it is responsible for 50 per cent of the gross revenue, then it should be classed as a separate department and the fixed charges carefully allocated.

Harry Reid, president Interstate Public Service Company, said that six years ago the freight business on his property amounted to 6 per cent of the gross revenue, while today it is in excess of 42 per cent of the gross. He mentioned the additional equipment and facilities which have been provided for handling freight and pointed out that in addition to the direct benefit to the railway in the way of increased revenue, there has also been an indirect benefit as a result of the favorable attitude created with the people on account of this additional transportation service.

Charles L. Henry, president Indianapolis & Cincinnati Traction Company, spoke to the effect that he believed the success of the electric railways depends in final analysis on the freight business, for it certainly is not apparent that the passenger business is going to increase sufficiently to make money for the interurbans. As evidence of his faith in the prospects for hauling freight in a profitable way, he referred to the extensive freight terminal that is about to be built in Indianapolis as a joint proposition of the several interurban lines entering there. He said this would probably be the finest interurban freight terminal in the United States.

Recognizing the fact that the private automobile, motor bus and motor truck are certain to find a traffic which they can haul profitably, Mr. Henry said that the interurban railways must develop that kind of traffic which the automotive vehicles cannot economically handle. As an example of this he cited the hauling of livestock by the Indiana interurbans and reviewed the circumstances which led the farmers to propose and support the passage of legislation authorizing the hauling of livestock through the city streets. This livestock service now brings an average of 170 carloads of business per month.

L. G. Parker, Cleveland Frog & Switch Company, said that the Cleveland Chamber of Commerce had been influential in bringing the electric lines a 200 per cent increase in their freight business during last year. This was distributed among the interurban lines in proportion to their ability to handle it.

H. A. Nicholl, general manager Union Traction Company of Indiana, expressed some doubt as to the general profitableness of livestock haulage. He said that where it was necessary to make long hauls in one direction and operate empty on the return trip, it was difficult to show a profit. He pointed out also that a great many things, such as lack of standardization of cars, sufficient capacity of sidings and stations, and lack of co-operation between traffic men on foreign lines, tended to prevent the building up rapidly of a profitable through freight business.

A timely meeting of the committee on standardization of freight equipment was called immediately following this discussion.

P. V. C. See, Akron, Ohio, said, in regard to freight equipment, that the Northern Ohio Traction & Light Company had at first made use of reconstructed passenger cars, built over with round ends and nicely painted and having a length of 50 ft. With this equipment there had been no trouble with the various municipalities through which the line runs, but it was found that trouble developed from overloading, from too great speed, and from the fact that the cars were too long. This resulted in high maintenance expense. On the freight cars purchased since the original equipment, the length has been reduced to 40 ft. and the gear ratio reduced so that the possible speed is 30 m.p.h. instead of 50. This has materially reduced the operating cost, one factor being that the 40-ft. cars are built very strong.

Mention was made of the possibilities of the interurban railways going into the pick-up and delivery service and Mr. Barnes said that in connection with a survey of the Kentucky lines of the Louisville Railway Company by A. C. Eastman, it had been recommended that the railway not enter into this character of service as it is seldom profitable.

MANUFACTURERS' PART IN DEVELOPING RAILWAYS

A paper on "What Manufacturers Have Done for the Electric Railway Industry" was presented at the Thursday morning session by H. L. Andrews, railway engineer General Electric Company. In this paper, Mr. Andrews summed up the imposing list of contributions which the manufacturers have made in the development of transportation equipment and power apparatus. The period through which the railways have been passing has called for methods of increasing the earnings and reducing the expenses. Working in these directions, the manufacturers have produced the Birney safety car, which Mr. Andrews said is responsible for adding from $17,000,000 to $18,000,000 to this year's net earnings of more than 400 companies using them. The extension of the safety features and one-man idea to other city and interurban cars is adding further savings which probably amount to about $4,000,000. The low-wheel light-weight interurban and city cars in use on more than sixty city and interurban properties will add more than $5,000,000 to this year's net earnings of the companies using them.

Other contributions of the manufacturers are the automatic control for substations; the development of the turbine, which has reduced the coal consumption from 7 to 8 lb. per kilowatt-hour to 2 lb. or less; the 60-cycle rotary converter, which has made it more practical to purchase power from central station companies rather than operate small generating plants in order to produce 25-cycle energy; the development of equipment for increased voltages, making transmission of energy over long distances more economical; the development of the commutating pole and ventilated type railway motor, which has resulted in a reduction of average maintenance cost from $3.50 to $5 per 1,000 motor-miles to 50 cents to $1 per 1,000 motor-miles; the production of multiple-unit control for train operation; the modernizing of air compressors and the introduction of automatic air brakes, with the striking development of the safety devices; and numerous labor-saving tools and machines for use in railway shops.

Mr. Andrews showed a comparison recently worked out to illustrate the reduction in investment cost made possible by modern motor design.

The following table is based on the sales of railway motors in this country by the two large electrical manufacturers for the year 1922. The upper figures represent the approximate number, weight and selling price of the motors actually sold; the lower figures are what a similar number of the heavier non-ventilated type of equal working capacity would have weighed and cost had the manufacturers remained idle for the previous ten years.

RAILWAY MOTOR SALES

Horse Power	No. Sold	Approximate Weight in Pounds	Approximate Price
25	3400	3,400,000	$2,550,000
35-45	3800	6,450,000	4,200,000
50	950	2,170,000	1,250,000
60-70	940	2,800,000	1,400,000
Total...	9090	14,820,000	$9,400,000
SAME VOLUME OF SALES WITH NON-VENTILATED MOTORS			
35	3400	6,800,000	$4,100,000
50	3800	10,500,000	5,720,000
60-70	950	3,300,000	1,630,000
75-90	940	4,250,000	2,100,000
Total ...	9090	24,850,000	$13,550,000
Savings to operators		10,030,000	$4,150,000

These figures indicate that the economies obtained by the railway industry in one year directly due to motor development were measured by 10,030,000 lb. less weight to be carried on the rails and $4,150,000 less in investment. The annual saving from this would be about $600,000 in fixed charges and at least as much more in operating costs.

Discussing Mr. Andrews' paper, M. B. Lambert pointed out that the operators have in many cases also taken the initiative and have presented ideas which have formed the basis of fundamental developments, such, for example, as the low-floor, small-wheel car.

The work being done by the state committees and by the Indiana Committee on Public Utility Information in particular was presented in a paper

by John C. Mellett, which appears elsewhere in this issue. This paper was discussed by Labert St. Clair, E. F. Kelley, Harry L. Brown, J. S. Bleecker and J. W. Colton. The importance of the right kind of publicity was emphasized and of the need for continuous, consistent effort in this direction. That the railways are taking this work up seriously was indicated by the report that 300 companies in the Central West are now advertising and that 170 of these are using purchased newspaper space for the purpose. The American Electric Railway Association is co-operating with the state committees, which are best able to handle this work locally, by supplying them regularly with information and statistics. There are now only fourteen states in the country which do not have committees actively working or in process of formation to broadcast utility facts.

The advantages to be derived from personal contact between railway executives and the communities which they serve, the ready medium for advertising offered by space in the cars, and the necessity for frequent changes of copy used for this purpose were also pointed out. It was shown that any form of advertising campaign should be carefully planned and consistently carried out by setting aside in the budget a definite appropriation for this purpose. The amount of this appropriation was discussed, it being pointed out that one company considered one-half of 1 per cent of the gross not too much. It was urged that a definite appropriation for publicity and advertising purposes should be made, even though it amounted to only one-tenth of 1 per cent of the gross, and that on such a basis effective work could be accomplished.

Engineering Council Session

The Central Electric Railway Engineering Council was in charge of the Thursday afternoon session, with Frank R. Coates presiding. The work of the council was reviewed in a series of short papers covering the scope and advantages of this work, which were read by the directors of the four sections. Rufus Moses, Youngstown, Ohio, outlined the purpose of the council and said that it should devote its activities to the solution of immediate construction and maintenance problems, rather than to the preparation of technical papers or the development of standards, which should properly be left to the national bodies. A. V. Brown, Sandusky, Ohio, went into the necessity for proper support of this work on the part of the executives, emphasizing the desirability of their attendance at sessions of the council. L. A. Mitchell, Anderson, Ind., showed how the council benefited the railway industry by helping the mechanical department heads through the interchange of ideas and the co-operative study of maintenance problems and methods. This tends to hold the cost of such work to a minimum. The future of the council was treated by Charles L. Stiles, Columbus. Ohio, who contended that it depends on the support received from executives of member companies.

The reports of the committees on track and roadway, power supply and transmission, and car equipment were presented by the three chairmen, T. H. David, G. H. Kelsay, and P. V. C. See, respectively. The work of these committees of the Engineering Council consisted of a presentation of the conclusions developed out of discussions on certain specific maintenance and operating questions. These reports are printed on succeeding pages of this issue. M. B. Lambert and J. P. Barnes took exception, in the discussion of the car equipment report, to allowing more than $\frac{1}{8}$-in. wear on axle bearings. A suggestion was also made that the conclusions in the report on emergency stop tests be compiled in legal terms for use by member companies in defending damage suits.

The report of the committee on track and roadway was accepted as "suggested practice" by the convention; that of the power and transmission committee was accepted in so far as definite recommendations were made; and the report of the committee on car equipment was referred back to the committee for further consideration.

William P. Day, president International Steel Tie Company, made a brief talk on the importance of tamping concrete under the ties and rails in building modern permanent type track. His talk was illustrated with two motion picture films which showed how this tamping was done on several railway properties.

At the final meeting on Friday morning, a talk was made by C. A. Boddie on the use of wired wireless by electric railway and central station companies. This appears in abstract elsewhere in this issue.

The main topic of the Friday morning meeting was "Co-operation of Manufacturers," which was presented by E. F. Wickwire. This address was enthusiastically received and is printed practically in full elsewhere in this issue.

Building in the Public Mind the True Conception of the Railway*

The Chairman of the A. E. R. A. Committee on Co-operation of Manufacturers States in Humorous But Pointed Manner How Manufacturers and Railways Can Jointly Create a Powerful Influence that Will Change the Popular Misconception of the Railways and Stave Off Proposed Ill-Advised Legislation

By E. F. Wickwire
Secretary Ohio Brass Company, Mansfield, Ohio

FIRST permit me to say that I think the man who invented conventions must have been troubled with insomnia. When I woke up this morning I looked in the next room and saw Jimmy Walker standing in front of the mirror with his eyes closed. I said, "What's the big idea, Jimmy?" He said, "Oh, I just want to see how I look when I'm asleep."

I might as well confess that I had very little sleep myself last night. So the first thing this morning I thought I'd take a little dip in the lake. When I got out on the beach a lady rushed up and said to me, "Excuse me, sir, but are you a lifeguard?" I said, "No, lady, I'm a wreck."

It won't take you long to discover that making speeches is not my specialty. In fact, when I come to Cedar Point I usually go out on the beach and practice my regular profession—astronomy, or gazing at the heavenly bodies.

We all know that for many years the general public was led to believe that electric railway companies were plutocratic; were coining money on a lot of watered stock, and that even 5 cents was too much for a ride on the trolley, no matter what the distance. In fact, the more people got in the way of trolley transportation the less they apparently expected to pay for it—just the reverse of what they demand in respect to other commodities.

We all realize that it's hard to deal with the public and get the true story across to it. It don't seem inclined to recognize the fact that it's probably more difficult to approach 100 per cent service in the electric railway business than in any other industry and it makes no allowance for that fact.

And lack of recognition often leads to serious results. For instance, you all remember the night the amendment went into effect. And the night after, when you went home sober and your dog bit you.

In short, it became evident to all of us a long time ago that the public needs more light on the subject, as the fellow said who took a lamp when he went courting. He met a friend who laughed at him and said, "Why, I never took a lamp when I went courting." The other fellow said, "No, and just see what you got."

Legislation directed against public utilities has won hearty applause from a large percentage of unthinking people who have not realized that their own welfare is connected with the fortunes of the very enterprises they are attacking.

A man will buy a house on the installment plan, paying so much a month. And in two years his payments will be just about one lap ahead of his depre-

*Address made before Central Electric Railway Association at Cedar Point, Ohio, July 20, practically in full.

ciation. Yet the same man seems to think that every dollar a public utility takes in is profit.

So the trolley companies long ago recognized the importance of getting the true facts of the electric railway situation across to that man, and some very excellent work has been done by the trolleys along that line. Unfortunately, however, a great many people are still suspicious of public utilities and are disposed to discount statements and articles put out directly by the utilities, especially in the form of paid advertising. And, as Northcliffe once said, "You can't disarm the nations until you have disarmed suspicion."

I'm driving at the psychology of this proposition. How many of you in this meeting would think of standing up and attempting to set forth your own virtues and expect to get away with it? But you might not hesitate to get up and extol the merits of your friend next to you, and the chances are the rest of us would believe you, especially if we didn't know him better than you did.

About two years ago the American Electric Railway Association realized the significance of this psychological fact and also the fact that to educate the public effectively required a still broader and more comprehensive effort than had been put forth.

Unless the educational work is done thoroughly there is danger of the public becoming somewhat confused, like the Irishman who was visiting his friend in America. Pat saw some cranberries for the first time. "Whut's thim?" "Cranberries," answered Mike. "And whut are they for?" "Why," says Mike, "they're foine to eat. When they're cooked right they make better apple sauce than prunes do."

The association awoke to a greater realization of the fact that electric railways have occasion to buy products of a great many manufacturers. It therefore follows that the prosperity of these manufacturers is closely linked with the welfare of the electric railway industry. So they decided to promote the idea of a closer relationship with the manufacturers, on the theory that two bodies which do not quite present the desired impression when standing apart, oftentimes harmonize when joined together.

Like the fellow and girl I saw on the beach this morning. He was very bowlegged and she was extremely knock-kneed. And yet, when standing together, they formed a perfect "O.K."

So the A.E.R.A. started a movement to enlist the active support of the manufacturers, and to that end appointed a committee to organize and direct the work, which I think is a pretty good committee, making allowance for the fact that it is burdened with me as its chairman.

Our committee was organized at the beginning of 1922, and its aim, in a nutshell, was to enlist the active co-operation of manufacturers in a comprehensive effort to improve the relations of the electric railway industry and the public.

One of the first and most important moves of the committee was to arouse the interest and active support of the vast army of employees and stockholders of manufacturers identified with the industry. And that was a problem of education. Strange as it may seem, very few of this influential section of the public realized that they had a dollars and cents interest in the welfare of the trolleys. Practically no effort has been made to educate them along this line, and yet there were many ready-to-use avenues open through

The Conception of "Mr. Electric Railway" Held by the Average Person, According to Mr. Wickwire

which this education could readily be carried on.

For instance, many of the manufacturers have factory publications and house organs, which reach all their employees. Bulletin boards are available in every factory connected with the industry. Meetings of factory foremen and employees are open for presentation of helpful and instructive talks. Stockholders are readily accessible through manufacturers' lists.

And yet these and many other channels through which the hundreds of thousands of manufacturers, employees and stockholders could be reached and profoundly impressed had never been utilized to any extent until our committee was organized.

At first our committee sent to the manufacturers printed matter which was so prepared that it could be modified to suit local conditions. The idea was that each manufacturer could pick out the portion which best suited his requirements and then put it out in the most effective form.

However, we soon learned by experience that we had to send out our ammunition in cartridge form—all ready to fire. In other words, we had to furnish material all canned and ready for use, so that the manufacturer would only need to apply a can opener and use the contents. In some cases we even had to furnish the can opener. We felt something like the young married man who went home one evening and asked his wife what they were having for dinner. "Well," she said, "Dearie, I'm afraid we'll have to go downtown to eat, I've lost the can opener."

Even when it came to following directions, we found some of the manufacturers a little absentminded. Like Bill Fincher at breakfast this morning. Bill was so absentminded that he poured the cream on his head and scratched his berries.

The work of our committee has been going on now about a year and a half and during that time we have been greatly encouraged by the interest and active co-operation displayed by a large number of manufacturers identified with the industry.

(At this point in his talk Mr. Wickwire called detail attention to an exhibit of samples of the co-operative work that is being done by the manufacturers. Included in this was a printed "Honor Roll" of those manufacturers who have taken part in this work.)

We feel quite sure that most manufacturers identified with the industry will take an active part in this movement as soon as they get a real understanding of the importance of the work and the value of their help. Of course, in every constructive movement of this kind there are always a few who take the attitude of the fellow who always grabs the stool when there is a piano to be moved. You gentlemen can help us with the manufacturer who is indifferent to the importance of this work and who is not participating. It has been said that an army fights on its stomach. But it moves on its feet. And if these manufacturers expect you railway men to keep their stomachs filled with business, why shouldn't you insist that they get to their feet and join this movement.

Now, having given you a little idea of what has been accomplished under the direction of our committee, I would like briefly to give you an outline of a further plan that we are working upon right now.

Based upon the committee's experience and observations in connection with this work, we have concluded that one of the outstanding aspects of the present electric railway situation is the mental picture of "Mister Electric Railway" which the average citizen carries around between his false teeth and his toupee. We have found evidence of the fact that a great many people are still carrying around in the back of their craniums a mental picture of Mister Street Railway as a plutocrat, with a fat tummy and a fat pocketbook.

As an indication of that fact, I have something here to show you. A.E.R.A. headquarters asked an artist to paint his conception of Mister Electric Railway—he was not given detailed instructions—look what he turned out!

It's a ridiculous conception of the real Mister Electric Railway, of course, but there are too many people who are still carrying around some such mental pictures as this of him. And furthermore, they seem to think that the process of dropping a nickel into a fare box changes it into a dollar bill and that the dollar bill goes solely to upholster the fat body of the fat man with the fat pocketbook.

Now, contrast that atrocity with another work of the same artist. This time he was interpreting his conception of Mister Bus Owner. And here is the result.

In other words, the man in the street —or the man in the cellar, if you wish— thinks of Mister Electric Railway as a pampered son of Paradise, while he considers Mister Bus Owner as a regular guy—a human being whom he can understand and sympathize with and help along in the world.

That seems to be one of the deep-rooted prejudices that we've got to dig out and overcome. And in order to get the result that we're after, it seems to me that we've got to get right down to a basis of plain talk to the plain people—something they can understand and which appeals to them—like the Greek restaurant keeper who has no bill-of-fare, but lets his patrons order direct from the table cloth.

I'll admit that it's not an easy job to offset the work of the radical element, which has poisoned the public mind to such an extent that some people actually think that public utilities are organized with the sole aim of robbing the public.

A chap went into a music store and asked to look at a harp, a guitar, and a lyre. The clerk said, "I can show you the harp, and the guitar, but the boss is out to lunch."

The radical agitator is not particular whether he plays on the harp, the guitar, or the lyre, so long as he strikes a chord that hypnotizes the masses. To combat this, we must combine all the present loose ends of the industry into one powerful unit. Then, if we keep pumping the facts into the public from all sides, it will gradually absorb the truth.

The brain cells of the most stupid person are always in action. Cerebration goes on whether they will it or not. A soft brick placed in water will absorb a quart if left a few days. A human brick will likewise absorb a bit of knowledge if it is soaked into him long enough.

Why is it that a man who wouldn't think of trying to cheat a jitney driver will brag about "slipping one over" on the electric railway company? Why is it that a man will make a joke out of it if a motor bus limps along half an hour late and "bawls out" the traction company if an electric car happens to be five minutes off schedule?

The other day a street car was standing peacefully on its own track when along came an automobile and tried to enter the car without paying. Why did the newspaper come out that night with a headline reading, "Street Car Hits Automobile."

Why is it that in many places the public officials, who are always imposing special taxation, regulation and other burdens upon the traction companies, turn right around and donate terminal facilities and other favors to the bus lines?

I know of at least one place where the county officials have actually turned over to the bus lines a part of the county court house, with its comfort station, for a waiting room. In other words, they encourage the bus lines by calmly appropriating for their use public property, maintained by the taxpayers. What do you think these pub-

By Contrast, This Is the Popular Conception of "Mr. Bus Owner"

lic officials would say if the electric railways attempted to avail themselves of the free use of this same waiting room? In other words, why should some public officials do so much to encourage the bus lines and do everything possible to discourage the electric railways?

The other day a citizen of the community referred to parked his car at the court house and went in to pay his taxes. When he came out he found that he had been pinched for parking in the "private preserves" of the bus lines. Can you beat that?

Why is it that the public complacently accepts such things as a matter of course? Perhaps the "Minute Men" are increasing in the country; you know, "one born every minute."

I heard of another place where the street railway, by the terms of its franchise, is compelled to maintain frequent service eighteen hours of the day to a certain factory district. This means operating the cars most of the time at a loss. During the off hours of traffic the cars run light, of course, and in the busy hours "wildcat" buses back up to the factory doors, not only to skim the cream off the city tariff, but also to steal the business of the interurbans, which are compelled by ordinance to maintain waiting rooms.

In other words, the public officials insist on the railway company feeding and housing the "transportation cow," but they give the buses equal milking rights.

Can you imagine a traction line which provides service only during the busy and profitable hours of the day?

Can you imagine jitney or bus lines being compelled by ordinance to provide service eighteen hours a day, in off hours as well as rush hours? Any council would laugh at such a supposition.

What's the answer to such discrimination?

Isn't it because public officials have reason to believe that public sentiment approves this scheme of things?

And, going still deeper into the cause, isn't it largely because too many men are carrying around this false mental plutocratic picture of Mister Electric Railway?

That being the case, why not strip this counterfeit plutocratic garb from the electric railway industry and let it appear in its true garb of overalls! The public at large seems to have a sympathetic fondness for the man in overalls. The "people's choice" seems to cater strongly to and has a wholesome fear and respect for the vote in overalls.

Therefore, why let them overlook the fact that the electric railway business is essentially an industry in overalls? We know that the picture of the fat man is not a true likeness of the man who prospers as the electric railways prosper.

Here is the real personification of the electric railway industry (page 141).

He represents more than half a million laboring men—motormen, conductors, linemen, shopmen, trackmen, factory workers, who depend for their living upon the success of our industry. We want to awaken in the public mind a spirit of sympathetic understanding for this man. We want the public to respect him and his rights. And, above all, we want to arouse *him* to a realization of the fact that it is to his interest to stand up and fight for the industry—*his* industry—upon which he depends for his livelihood.

Now it is one thing to outline the result to be obtained and it is quite another to point out how to go about getting the result. I want to submit to you a plan our committee has hit upon to help create a mental picture of the electric railway industry as a man in overalls.

Some photographs of real workmen, who are a part of the electric railway business, have been taken and printed in car poster form for the use of the electric railways. One pictures Martin Donnelley, one of 77,000 motormen, not to mention 63,000 conductors. Another shows Adam Stillwagon, who has been working on the track for eighteen years. Dan Leonard, who has been a lineman since he was a youngster, is the subject of another poster, and so on. This group of railway wage earners totals close to the 300,000 mark. Another

poster shows Bill Ernst, who has been making electric railway supplies for fifteen years—a representative of a group which numbers untold thousands.

There is a vast army of workers like these, all dependent upon the welfare of the industry for their livelihood, and our plan is to put out in poster form these actual photographs of men in overalls identified with the industry.

Imagine thousands of these posters broadcasted through the country, displayed in street cars and plastered on factory bulletin boards, showing the workingman as an integral part of the electric railway industry. Surely such pictures as these will begin to take the place of the inaccurate portrait of the plutocrat which is now hanging in too many cranial galleries, and I think you will agree that there is likely to be a favorable reaction on the part of the public.

That sort of thing should go a long way toward convincing the plain people that when they throw mud at the trolleys they are really besmirching their own fellow workers — brother members of their own lodge. And once we get the public feeling that way about it, we will have the statesmen of the "cobblestone" wards on our side too.

When the voters really begin to show a friendly disposition toward anything, their chosen representatives respond as quickly as a seal when there is fish in the air. They have to. They know that if they don't their erstwhile constituents will be saying, "Yes, old Mike was a good office holder, as office holders go—and as office holders go, he has went."

However, our committee realizes that it is not enough to run a few thousand posters through the press and put them in the mail. They must be displayed widely, thoroughly and intensively. There are good places waiting for thousands and thousands of them, where they will be seen and understood and where they will help accomplish what we are after. This plan needs to be put across in a big way in order to create the kind of impression that we are after and everybody connected with the industry should realize that his help is needed to make the plan a success.

Now I would like to mention the fact that this important work has been carried on by a voluntary committee, with the part-time assistance of Labert St. Clair, publicity director of the American Electric Railway Association. In spite of the other demands upon Mr. St. Clair's time, he has given us very able co-operation and enabled us to do some very effective work.

However, I believe that we have gone far enough to show that the work is much too broad and too valuable to be left to the direction of a voluntary committee, composed of men who must give most of their time to their personal business affairs.

In short, it seems quite evident that this whole movement should be handled like any other big enterprise, if it is to reach its full measure of success.

It is important enough and productive enough to justify the entire time of a capable director with a competent staff —men who can devote their whole energies to the organization and direction of the work.

Please don't overlook the fact that, in addition to the educational activities of such an organization, a truly tremendous force could be brought into play and utilized in connection with legislative matters affecting the industry. A capable director and his staff of office and field men could card index the organization as it was built up and they could mobilize its full strength and throw it into the fight as a powerful unit whenever occasion demanded.

But the Man in Overalls, Some 300,000 Strong, a Cheerful Public Servant, Is the True Personification of "Mr. Electric Railway"

Take the automobile club plan of organization, for instance. In Ohio we have something like seventy local clubs affiliated with state and national associations. That means that the membership of the local clubs combines to make up the membership of the state and national association.

When a legislative matter at Washington is to be influenced one way or the other, the full strength of every club is drawn into the fight.

When action is needed at the state Capitol, all the affiliated clubs in the state respond as a unit. And when 80,000 votes speak together, with one voice, the people's choice listens and most generally acts.

A municipal matter is, of course, handled by the local club.

In other words, the same machinery is used, as required, for local, state and national legislative matters. As a matter of fact, the automobile organization has made itself so profoundly felt that legislators are always casting about to find some way to please it.

For instance, two Western states this past year have enacted laws to compel night-driven herds on the highways to be equipped with tail lights. This is an excellent idea, but I think it would be better to compel pedestrians to be equipped with reflectors—a red light for females under thirty, a violet light for grass widows and a green light for old maids. In that way a lonely motorist could tell at a glance just who to run over and who to pick up.

Now just stop and imagine that the full strength of our industry would be combining the railways, with their employees, and the manufacturers, with their army of workers. Properly organized, under adequate competent direction, think what a powerful central station could be created, with its network of communication lines flung the length and breadth of the land. Surely there would be energy enough available to get a square deal and reasonable regulation for the public utilities then!

But we must get in the right condition for it. I met a railway man the other day coming out of a chiropractor's office, and I said to him, "What are those chiropractors, anyway?" And he said, "Why they knead your spine — your backbone." And I said to him, "Well, I need my backbone myself; and our whole industry needs a stiff backbone. And every man connected with it should become imbued with a fighting spirit, so that he will be ready to fight a whole regiment single-handed, if need be. Like an Irishman over in the fighting zone of Ireland, watching an Orange parade that was passing. He watched for a minute or two and growled, "Begorra, they wouldn't dare to pass Chistnut and Cork Streets four years ago." And as more went by he muttered, "Yis, and bejabers they wouldn't dare pass by Clancy's saloon two years ago." He glared a little longer, went into Clancy's for a drink, came out and with rising wrath shouted, "Yis, an' there hadn't many more of thim better pass by here right now."

Possibilities from Interurban Freight*

Best Future of Electric Lines Is in Handling Freight—Main Handicap Has Been Lack of Adequate Equipment and Terminal and Station Facilities—500 Additional Box Cars Could Be Profitably Utilized in C. E. R. A. Territory

By T. H. Stoffel
Railway Department, Westinghouse Electric & Manufacturing Company

SERIOUS reductions in the income of the interurban railways have resulted from the use, by the riding public, of the passenger motor vehicle. It is generally conceded that there is no way permanently to overcome this condition, but that still further reductions may be expected, due to the ever-increasing number of automobiles on the highways. It is questionable whether the present tendency to effect economies in passenger operation, through the use of lighter weight cars, etc., is more than a temporary solution of the problem.

With these conditions in mind it naturally follows, therefore, that if interurban railways expect to continue to live, some means must be found to augment their depleted incomes to such an extent as will enable them to again build up the properties to a high standard of maintenance, demonstrate their earning capacity, and make investment in their securities attractive to capital.

The most logical and the surest means of accomplishing this is through the development of freight business. Existing operating facilities, including roadway, track, power plant, etc., are idle a large part of the time, or are employed to the extent of only a fraction of their capacity. Much tonnage can be hauled at night and during these idle periods and off-peak hours, thus making unnecessary any further investment in power facilities, and at the same time utilizing this idle equipment in revenue-producing service. The cost of providing adequate terminals, motive power and rolling stock, also a competent traffic organization, which are other essential requirements for conducting a successful freight business, is comparatively small.

It is true that more or less freight is being handled by a considerable number of electric lines, but it is also true that, in the past, the managements generally have given but little attention or encouragement to this phase of operation. Such service as is being provided is largely the result of insistent demand on the part of shippers, and as a general rule no consistent efforts have been made to conduct the business economically or along progressive lines, notwithstanding this branch of service is a proved source of net income.

The general lack of transportation facilities is today the principal factor limiting industrial development and trade, and the situation has become so acute that many national associations and civic bodies, including the United States Chamber of Commerce, have undertaken investigations and studies at considerable expense, to determine if possible what can be done to improve existing transportation facilities and methods, and to provide more adequate means of taking care of the constantly increasing requirements.

A study of the electric railways of the country shows conclusively that they afford a definite and existing means of relieving the situation, and that they can, if they will, make for themselves an important and permanent place in the general transportation scheme of the country, with much financial benefit to themselves. There is no tenable reason, for example, why a co-ordination of transportation facilities should not obtain, which would provide that electric railways should handle all freight between terminal and jobbing centers for destinations common with the steam roads, thus relieving facilities of the latter for the more remunerative and longer haul tonnage.

Transportation authorities have presented figures which show that short-haul, and especially less-than-carload traffic, say for distances up to 75 or 100 miles, cannot be handled by steam lines except at a loss, on account of the necessarily large overhead expense involved in providing extensive terminals, trackage, etc., suitable for heavy long-haul traffic. The electric line can handle such tonnage more economically and at a profit, by reason of its more flexible and lighter equipment, smaller terminals and much lower overhead.

Net Earnings on Freight Investment

That the handling of freight is a very profitable source of income for electric railways needs no proof other than the results obtained by lines now engaged in this branch of service, notwithstanding that as a general rule rolling stock, motive power and other facilities are wholly inadequate and often not suitable. Only a few electric lines have undertaken to separate freight income and operating costs from those of other branches of operation, and therefore the majority do not fully realize the extent of the net returns from freight business.

It may be truthfully stated, however, that net earnings of from 15 to 40 per cent on the freight investment may be expected, depending on the location of the line, the class of tonnage available, the methods and efficiency in handling and the facilities provided. As an example, one line which a few years ago undertook consistently and intelligently to develop its freight possibilities received a gross revenue in 1922 of approximately $390,000 and enjoyed a net profit of over 27 per cent on a freight investment of $320,000, or equal to 7 per cent on an investment of over $1,250,000. In allocating operating expenses on this line everything which could properly be assessed against freight income was so charged, including interest, depreciation and taxes. Another line has developed its freight service to the extent that 75 per cent of the gross revenue is derived from this source.

The vast industrial territory comprising the states of Indiana, Ohio and Michigan, traversed by a network of some 5,000 miles of electric lines included in the membership of the Central Electric Railway Association, without question produces the greatest volume of tonnage of any district in the United States, of the class which can be readily handled by the average interurban road, and for which such roads are especially adapted. The amount of such tonnage available is almost unlimited, in both carload and less then carload quantities.

While practically all of the lines in this territory are offering freight or express service to some extent, the surface of possibilities has hardly been scratched. With few exceptions no consistent efforts have been made to develop the traffic; terminal facilities are wholly inadequate and congested, resulting in excessive station labor costs and delays and expense to shippers; team tracks and sidings for carload loading and unloading are almost unknown; motive power is of small capacity, making necessary the operation of many small train units, with consequent excessive train labor and power costs; and the shortage of trail cars of various types is very acute. Solicitation with present facilities is hardly necessary and it is found difficult, by reason of the shortage of rolling stock, to take care of even the merchandise tonnage which is practically forced upon them. Many lines are confining their efforts to the handling of less than carload tonnage on account of this lack of equipment, with the idea of providing maximum service to the greatest number, and make no attempt to handle carload and more remunerative business.

Need for 500 Additional Trail Box Cars

The most urgent and immediate need of the lines in the Central Electric Railway Association territory today is trail box cars. It is believed that 500 additional cars of this type would be absorbed in the service at once, and without effort to find loading for them. Three or four times that many would ultimately be required under consistent development. One result of this shortage of rolling stock is the tendency to load present cars beyond their capacity. This is not only dangerous, but increases equipment maintenance costs and causes loss in revenue while cars are out of service for repairs, and is a practice which should be regulated.

*Abstract of paper presented before the Central Electric Railway Association, Cedar Point, Ohio, July 18.

There is an ever-increasing amount of interline tonnage available, the movement of which is now limited by the number of trail cars which can be spared from local service. In many instances when cars are permitted to run through to destinations on other lines, there are frequent and sometimes serious delays in returning them to the owners. In view of these facts and also due to the general pressing need for additional rolling stock, it is believed that in the purchase of new cars some scheme of common ownership should be worked out which would make it possible for all lines to have a supply of cars for both local and through loading at all times.

Along these lines it has been suggested that the electric lines in the group represented by the Central Electric Railway Association form a Car Trust Association, each member road of such association to delegate a representative, and the group of representatives to form a car trust committee, which would have power to purchase cars on the car trust plan. Financial standing should be given this committee by underwritings of the member roads; the individual amounts of such guarantees to be based proportionately on a certain number of cars to be allotted to each line for inventory purposes, the car trust member lines to pay the car trust committee a fixed per diem charge with a minimum guarantee; the per diem and minimum to be of such amount as to enable the car trust committee to pay certificates as they become due. If it should happen that any of the cars are idle during slack periods or for any other reason, the per diem charge should be prorated on a basis of the original allotment. Under this plan each member road would carry an adequate supply of parts for repairs, and M. C. B. inspection at transfer points would govern responsibility for damage or mechanical defects.

The principal advantage of such a plan for the purchase of rolling stock lies in the fact that cars will be available for use on any line in the territory, and the necessity for prompt return is to some extent eliminated, which in many instances would permit of use for other loading, thereby reducing empty car mileage. Another advantage is that if there was a falling off of available tonnage on any certain line or in any particular district, cars could be assigned to roads having loading, keeping them continually in service.

Before purchasing cars under this plan it would be advisable for all interested roads to develop and decide upon a standard type of interurban freight car, suitable for operation on all lines. This car should not be longer than 40 ft. inside measurement, and should be equipped with M. C. B. radial draft rigging and automatic air brakes. No doubt a much lower price per car could be obtained from manufacturers for such a standard car if purchased in quantities.

Another outstanding and serious disadvantage to the proper development of freight traffic is the lack of adequate station and terminal facilities, including team tracks and sidings. At practically every terminal of any size, shippers' conveyances are delayed, sometimes for several hours, to unload shipments at the platform. These delays, to say the least, are costly to patrons and as a result many shippers take advantage of electric line service only to non-competitive destinations, and often resort to the use of the more expensive motor vehicle in their desire to satisfy customers, when as a matter of fact the interests of all would be better served by the electric line.

There is a large amount of carload tonnage which might be handled, but the failure to provide terminal team tracks and convenient sidings in the rural districts, together with the shortage of cars, prevents the securing of this very desirable traffic. While carload rates as a general rule are lower than the merchandise rates, the labor expense of loading and unloading is avoided and net earnings per car in many cases amount to more than when loaded with the higher class merchandise. With suitable terminal team tracks it is also frequently possible to load solid cars of merchandise for certain destinations, direct from dray to car, thus relieving congestion in the warehouse and materially reducing handling expense.

Another matter worthy of serious consideration is the possibility of materially reducing train operating costs. The greatest items of expense in freight handling are station and train labor. Due to the large number of small capacity motor cars in freight service, a great many trains of from two to four cars each are operated over the same line daily. Both train labor and power costs can be materially reduced through the use of motive power able to haul longer trains. Motor equipment capable of handling trains of from six to fifteen cars, known as the low-speed, field-control motor, has been designed by manufacturers especially for interurban line freight service. A distinct advantage in the use of this type of motive power is that trains of ten or more cars can be handled with no greater power consumption than for a single high-speed passenger car and therefore the possibility of overloading substations is practically nil.

The handling of long trains may be deemed impossible on account of restrictions imposed by certain communities through which trains must pass, but it has been found that as a general rule the public and the authorities are inclined to be reasonable and will withdraw their objections if fully informed as to the necessities and advantages of such operation, or if they can be made to feel that advantage is not being taken of them.

Carload Business Very Desirable

What can be done in the way of securing and handling carload freight, under well directed and systematic effort, is emphasized by what has been accomplished in handling live stock by the lines reaching Indianapolis. Information at hand indicates that during the past year electric lines transported approximately 8,500 carloads of live-stock in and out of the Indianapolis stock yard, or about 35 per cent of the total business of that yard. One of these lines also demonstrated its efficiency and capability by handling over 1,500 carloads of cement within a few months, and with such satisfaction that the manufacturer felt justified in making a considerable expenditure to increase the capacity of his plant with the idea of reaching out for other markets having electric line freight service.

The same line has also developed and expedited perishable freight service and is hauling trains of from four to seven or eight cars of fruit and vegetables daily during the season. This service provides for shipment late in the evening and insures delivery at the terminal before three o'clock in the morning, in time to be disposed of before business hours, and is exceedingly popular with shippers and profitable to the carrier.

There has been a general understanding that steam roads were unwilling to join with electric lines in through traffic arrangements. No doubt some foundation exists for this, but it is evident that steam roads are beginning to realize that co-operation and co-ordination with electric lines is not only feasible, but is mutually advantageous. As a matter of fact, practically all interurban lines located west of the Missouri River have been able to secure joint through-traffic arrangements with steam roads, and as a general rule are parties to steam line tariffs, including trans-continental. Recently, too, a number of electric lines in the East have completed similar arrangements; in fact I believe one of the lines, a member of this association, has successfully concluded negotiations, opening to it steam line territory extending from St. Louis and Chicago to Buffalo. One of the Ohio lines, also, has joint tariffs and divisions with steam lines between Chicago and Buffalo and intermediate points, and stations on its line. In both instances the prospects are bright for a still further extension of territory.

There are many other ways and methods open to electric lines for developing freight tonnage, such, for example, as locating industries on the line, building sidings to established industries, finding markets for products of the farm, etc., but after all any program of development is useless unless the tonnage can be handled expeditiously and facilities and equipment for doing so are available. It is practically impossible to estimate the amount of tonnage which might be secured under intelligent direction and consistent development. It is the experience of electric lines generally, and especially in the C.E.R.A. territory, that whenever facilities for handling have been provided, tonnage was available.

The statement was recently made by a large shipper in C.E.R.A. territory, that the use of electric lines in the forwarding of his shipments had enabled him to triple his business in three

states within a short time, and that trial shipments made by him for distances up to 250 miles, indicated that the service of electric railways was from three to ten days better than either the steam roads or the American Railway Express. At that time this concern desired to load from six to eight trap cars per day for various junction points, for distribution, if cars could be furnished. Another shipper who has practically discontinued the use of electric lines in his shipments because of the lack of facilities and equipment would load four trap cars per day, if rolling stock could be furnished regularly and a place for loading provided. Any number of similar instances could be cited.

Work of Indiana Information Committee*

By John C. Mellett
Director Indiana Committee on Public Utility Information

"UTILITY Information Work," the subject of this discussion, may not mean a great deal. I shall therefore introduce the subject with a text, taken from the last of the prophets, Abe Martin. He says, "The fe'ler that don't advertise may know his business; but nobuddy else does." If anybody present does not like that text, he may use this one, offered by a writer in that big book the Gideons are pushing. The Gideons do a good deal of business with the tractions, and some of you may prefer to reciprocate and follow a text from their book. Here it is: "Let your light so shine before men that they may see your good works." That is the advice of Matthew, seconded by the Gideons.

We in Indiana like our own prophet and his suggestion with regard to advertising, but we also try to follow Matthew. We have been doing it, in the utility business in our state, for more than three years. The Indiana Committee on Public Utility Information was organized in January, 1920, in order to let the good works of Indiana's gas, traction, electric, telephone and water utilities shine before men, so that the state might see their good works; and, if I may say so, in order that the light might continue to shine.

For the Indiana committee, like a good many other healthy youngsters of this day and age, was born of necessity. War conditions brought Indiana utility operators to the realization that they had to tell the people about their business. They should have realized it sooner, but they are entitled to credit for seeing their need before the operators of most other states had opened their eyes. Only Illinois preceded Indiana in organizing and maintaining such a committee.

In Indiana during the war the utilities, tractions first of all, were called upon to be patriotic and self-sacrificing while many unregulated businesses profited and some profiteered. Under regulation they were held down until the rising waves of production costs threatened to drown most of them. The theory and promise of state regulation was that after the war the utilities would be permitted to increase their rates and re-establish themselves on the firm footing to which they were entitled. But the war ended, and the public demanded lower prices. In Indiana the public knew nothing of any patriotic starvation suffered by the utilities, and when it began demanding lower prices, it included requests for lower prices on all utility services. Utilities appealing to regulation therefore found regulation, for the time being, helpless in the face of public opinion.

In a word, the utilities were holding the bag, which is a worse job in business than in snipe hunting. It was decided that advertising and publicity must be used extensively to build up the utility case before the public. Utility men in our state were confident that, once the facts were presented, the people would permit justice to be done the utilities and their owners. Therefore they organized the state committee, and set to work.

We started at once the publication of a small weekly paper, for distribution among newspaper editors, city and state officials, libraries, schools and colleges, and women's clubs. We arranged to provide speakers to discuss utility problems before all kinds of meetings, and undertook to educate backward utility operators in the merits and benefits of advertising and publicity.

At first, our work dealt with the subject of rates, more than anything else. The immediate task was to show the people of Indiana that the utilities, though vital to comfort and prosperity, had been mistreated. With this in mind we emphasized increases in the cost of producing traction, gas, electric, telephone and water services. We showed how these increases were still, at that time, growing, while rates had in the main stood still. By hammering these points day and night, we managed so to educate the people of the state that regulation was able to grant increases in rates. We have kept up this program, with the result that Indiana utilities are generally in good condition now.

Having tasted the fruits of publicity and advertising, Indiana utilities found them good. We have therefore gone into other problems as well as rates. We have worked to educate the people in the fundamentals of the utility business, treating such subjects as valuation, turnover of capital, the fair return, and so on. Within the last eighteen months our committee has met and fended off the threat of abolishment of state regulation—chiefly by means of widespread publicity showing the benefits of and necessity for state regulation. And just now we are working on the subject of taxes, in the hope of escaping a slow, lingering death from acute or malignant taxation.

Indiana utilities have learned that they can exert a much greater influence in protecting themselves against misunderstanding, ignorance and politics when they are compactly organized than they can when they are not organized. In years past, Indiana utilities operated each for itself, "and the devil take the hindmost," with the result that he took not only the hindmost but several others as well. The cost of cooperation has been so small as to be almost negligible to the individual companies, but the results have been large. Our assessment against member companies is only one-fiftieth of 1 per cent of gross receipts, but most of the members would multiply their contribution by several times before they would give up the educational program we have undertaken.

In the main, the committee endeavors to restrict its efforts to problems that are general to all the utilities. But last year we made an exception and rendered some service to the tractions by helping them convince the public that unrestricted, unregulated motor bus and jitney operation is unfair and dangerous. The fight on this point is not yet won, but it is coming our way. We convinced everybody in Indiana, last year, that the jitneys and buses should be regulated—except their operators and the Legislature. We have no hope of convincing the jitney and bus men, but we do expect to convince the Legislature by our own efforts and the efforts of the public, which is for us, thanks to publicity and advertising efforts.

So much for co-operative work in behalf of the utility industry. Our committee has done one other thing, to the everlasting good of the business. It has preached for three years the importance of maintaining friendly relations with the newspapers. The committee has worked on the state as a whole. Individual operators have been asked to keep in touch with their local newspaper men, and they have been doing so more consistently than ever before. I do not mean by this that they have been hanging around upon the editor's coat tails. They have simply made it a point, when anything was in controversy, to see that each editor knew the facts in the case, and that he conveyed these facts to his readers, either through publicity, news or advertising. The result has been a fairer public opinion throughout the state.

Indiana's committee has worked hand in hand with Illinois, Ohio, Michigan, Kentucky and a score of other states where the utility executives took up this program. We hold no brief for the others, but in our state the operators are glad they have been letting their light shine before men, according to Matthew's advice. And in keeping with the spirit of Abe Martin's axiom, since utilities have been advertising, the state knows more about the utility business than it ever did before. Which is a good thing for both the public and the utilities.

*Abstract of paper presented before Central Electric Railway Association at Cedar Point, Ohio, July 19.

Emergency Stop Tests

C. E. R. A. Special Committee Reports on Distance to Stop City and Interurban Cars With Air and Electric Braking

A SERIES of braking tests on several types of cars was made during the week beginning May 13 under the auspices of a special committee of the Central Electric Railway Association consisting of S. W. Greenland, chairman; S. D. Hutchins, H. C. DeCamp, C. A. Brown, G. K. Jeffries and D. D. Ewing. These tests were described briefly in ELECTRIC RAILWAY JOURNAL for June 2, page 933. Emergency stop tests were made on: (a) Interurban car, double truck, four motors. (b) City car, double truck, four motors. (c) City car, double truck, two motors. (d) Birney safety car.

CONCLUSIONS

As the result of a careful analysis of the test data, the following conclusions were reached:

1. There is no one best way to stop any car in an emergency. In general, the best way will depend somewhat on the type of brake and motor equipment.

2. As a broad rule, subject to occasional exceptions, it may be said that the best way to stop a car equipped with air brakes is to apply emergency air and sand simultaneously throwing the controller to the off position.

3. The electrical methods of braking, reversed motors and bucking motors, subject the equipment to very severe strains. Because of the abruptness with which the braking force is applied, the value of these methods in emergency braking is more apparent than real, except in those cases in which the air brakes from some cause are inoperative.

4. Of the two electrical methods, reversed motors and bucking motors, the reversed motors method is the most effective.

5. If the motors are reversed in conjunction with emergency air and sand, skidding invariably results, and even under good rail conditions, the results are not superior to those obtained using air alone.

6. The electric braking methods are more likely to produce erratic results than the emergency air, and for this reason should not be resorted to as a general practice.

7. Because the rail conditions under which these tests were made were better than those ordinarily obtaining on city streets, the results should be regarded as minimums rather than averages or maximums.

8. The best way to stop a Birney safety car in an emergency is for the motorman to raise his hand from the controller handle.

A brief summary of the details of the four cars tested is given in the accompaning table. The test track selected was on the Lebanon-Crawfordsville branch of the Terre Haute, Indianapolis & Eastern Traction Company, and consisted of a stretch of level tangent track about 1 mile in length just west of Pettigrew substation. During the first two days of the test, the weather was unsettled and the track was wet at times. Mostly, however, the rails were dry and in excellent condition for braking tests.

DETAILS OF THE TESTS

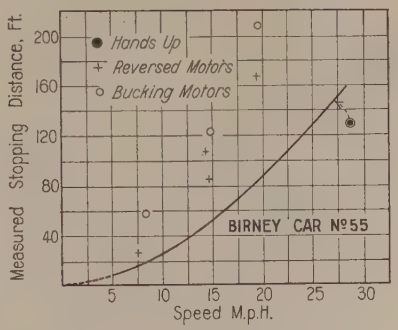
While under test, each car was equipped with: (1) A chronograph, recording time in half-seconds and car wheel revolutions; (2) a trainograph, recording brake cylinder and other pressures, and time, the time mechanism being operated from the chronograph; (3) a graphic recording speed meter with a time pen operated from the chronograph; (4) an electrically-operated counter for car wheel revolutions.

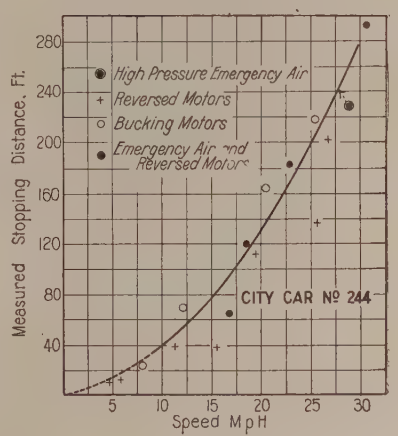
These instruments were so connected as practically to eliminate personal errors in timing. Time was also measured with stop watches. A shotgun was used to mark the track, and the report of the gun was the emergency signal to the motorman. This plan was decided upon in order to take into account the personal element of the motorman in reacting to a signal. The stopping distance was measured with a surveyor's steel tape. The speeds were determined from the chronograph records.

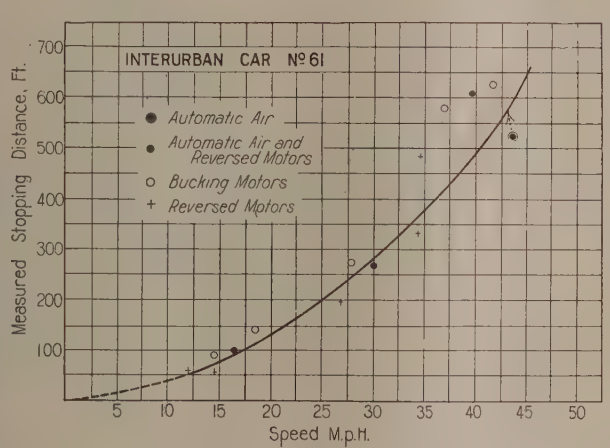
The more important data resulting from the tests are shown in the speed-distance curves. On the curve sheets the lines drawn to represent the data for emergency air braking are average lines, the points from which they were drawn not being shown. For comparative purposes, these were drawn as reference lines, and the points for the other tests were simply marked on the sheets, no curves being drawn. It must be remembered that individual points for the airbrake curves fall both below and above the average line.

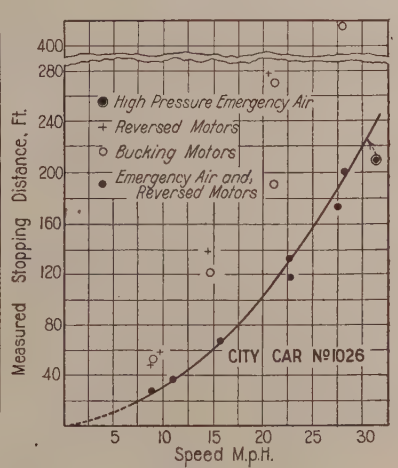
In the tests, with the Birney car, marked "Hands Up," the motorman simply raised his hand off the controller handle when he received the emergency stop signal.

Of the four cars, No. 244 was the only one in which the method of reversed motors showed any decided advantages. However, the braking power









Distances for Stopping with Emergency Air Are Shown by the Curves, and for Other Methods by the Points

SUMMARY OF CAR DATA

Car No.	61	1026	244	55
Owner	T.H.I. & E. Tr. Co.	I.S.R. Co.	Ind. Ser. Corp.	N.I.P. Co.
Type	Interurban	City	City	Birney
Weight (empty)	77,400 lb.	39,700 lb.	34,200 lb.	15,200 lb.
Number of trucks	2	2	2	1
Number of motors	4	2	4	2
Kind of motors	W–304	W–310–E–2	W–506	G.E.–264
Gear ratio	24-63	15-69	14-78	13-74
Type control	K	K	K	K
Type of brakes	Straight and Automatic	Straight	Straight	Safety
Wheel diameter	35 19/32 in.	31⅛ in.	29⅝ in.	24⅝ in.
Per cent braking Power at 50 lb. brake cylinder pressure (car empty)	102.1	58.0	83.5	167.0

of this car is about 80 per cent, or considerably below the commonly accepted standard of good braking practice.

The tests were run under the direction of D. D. Ewing of Purdue University, assisted by P. B. McGinnis and C. W. Melephant. The analysis of the data has been under the direction of Professor Ewing, assisted by J. Y. S. Fralich. Owing to the importance of the detail data taken in addition to that on stopping distance and time, the Engineering Experiment Station of Purdue University has offered to analyze and publish the detail data. This work is now in process, and is sufficiently advanced to permit drawing of the general conclusions outlined above.

Reports of Committees, Central Electric Railway Engineering Council*

Report of Track and Roadway Committee

1. (a) What is the best way of reclaiming old track in pavement?

The best method of reclaiming old track in pavement is by welding either thermit, cast or seam welding.

If the joints are seriously surface bent, rail of the same section in lengths not less than 12 ft. should be inserted, welding the joints by any of the foregoing methods.

Inasmuch as the paving area in this 12 ft. or more of track is disturbed we recommend new ties be installed at this time upon 6 or 8 in. of gravel or stone ballast.

If it is not deemed advisable to expend a large amount of money on tie renewals and joints, iron and wood shims can be resorted to as a temporary relief, and will probably keep track in fair condition from one to two years depending entirely upon tie and subsoil conditions.

Where track is 1 in. or more over gage, tie rods should be installed, and if not too expensive as regards paving repairs, the track should be regaged and lined.

(b) What is the best way of reclaiming old track in unimproved streets?

Make a general lift, add new ballast, take care of drainage where possible by installing drainage systems through the center. Replace old bars where necessary, and if rails are surface bent to any extent, they should be replaced or straightened. This is a broad question and local conditions will have to be considered.

2. (a) What results have you had with welded joints in inclosed track?

Good results.

(b) What results have you had with welded joints in open track?

The committee recommends that only intermittent and all combination joints be welded in open track. No rail to be continuous for greater length than 60 ft.

3. What has been your experience with electric welder in reclaiming special work?

The committee has found that a great amount of special work has been reclaimed with the electric welder and very good results obtained in many cases. We think there is much room for improvement along this line. While the welding of manganese has not been as successful as hoped for, special work of this type has been kept in service for as high as three years, thus delaying renewal for that period.

4. What has been your experience in building up special work by oxyacetylene?

The committee finds the use of oxyacetylene economical only in rail cutting and shop welding.

5. What experience have you had with treated vs. untreated ties?

The committee recommends the use of treated ties in open track and unimproved streets.

6. When joints are welded are rail bonds necessary?

No.

7. When rail joints are welded are bonds removed?

Where welding is done on old rails, if bonds are functioning, they should be left, as the welding of rail is not always as successful as expected. The general practice is not to bond the joints on new rail when joints are welded.

8. What methods have member companies used to provide proper drainage at crossings between steam and electric roads so that proper surface can be maintained?

The experience of the committee has been that no drainage is provided in most cases. In cases where drainage has been provided it has been found possible to maintain good surface, but in a few cases installation of a drainage system has been unsatisfactory. Would recommend that wherever possible some method of drainage be installed. Local conditions would determine the method to be used.

9. Has any difficulty been experienced in properly maintaining automatic track circuit block signals where cinder ballast is used?

The committee is of the opinion that with cinder ballast in contact with the rail more trouble will be experienced with signal circuits than with other kinds of ballast, buf all kinds of ballast should be kept clear of the rail.

10. Should track bonding be installed and maintained by track or overhead departments?

All bonding, design, application and responsibility should be under the supervision of the electrical department. All work to be done with maximum economy possible to all departments interested to avoid duplication of work.

11. Give comparative efficiency of the Weber or other continuous types of splicers of the four and six-hole type.

We believe while the two joints are equally efficient the continuous type requires less upkeep and the lower cost would be in its favor.

12. What effect has bad track on the upkeep of equipment?

Bad track has a decided effect upon the cost of equipment maintenance.

13. Is there a welding machine on the market that can do track welding as well as bond welding economically?

The majority of welding machines on the market can be used for bond welding economically.

Report of Power Supply and Transmission Committee

1. What is the effect on the overhead line of the use of sliding contact shoes, and are there any advantages from a transportation standpoint or from the standpoint of economy?

The principle of the sliding shoe seems to be good but the committee does not believe it has yet been fully developed to a finished and practical article, either from a transportation or economical standpoint. It has been reported as being quite successful on a few roads, reducing vibration and thus being more quiet than a trolley wheel at high speeds. There have been many sliding devices designed but none of them fill all requirements. With most of them there is trouble in backing up and some claim there is an excessive wear on the trolley wire. It is the opinion of the committee that the trolley system as developed in the past for the purpose of operating the trolley wheel is not properly designed in every respect for the operation of the shoe. The committee believes that an investigation of the subject has not been sufficiently complete and the subject would be well worth additional study.

2. (a) Are any companies furnishing power to individual consumers in the rural districts where special transformer equipment is required? (b) What equipment is furnished by the railroad company? (c) What is the basis of charge for such electric service?

(a) Yes.

(b) The committee is of the opinion that it would not be economical or practical to furnish current to any small individual consumer or limited number of individual consumers direct from any important high-voltage line. For service from low voltage lines consumer should be required to pay the entire cost of primary and secondary lines, transformers, auxiliary equipment and cost of installation, and same to become the property of the company and to be maintained and operated by it.

(c) The basis of charge should be sufficient properly and safely to maintain all the apparatus and equipment, to supply the service, to cover all the losses incidental to the service, interest, depreciation, taxes, insurance and a reasonable profit.

This subject of rural service has been most puzzling to lighting and power utilities for several years, and is receiving a great deal of study by committees of the National Electric Light Associations, various state associations, state commissions and many individual companies. It is, therefore, the opinion of your committee that this is a matter of sufficient importance to justify the Central Electric Railway Association in appointing a special committee to make a study of the reports and data available for the purpose of being able to present a more practical working plan to take care of such service.

3. What should be the length of ear for No. 00, No. 000 and No. 0000 trolley wire, both round and grooved?

It is the opinion of the committee that all trolley ears for No. 00, No. 000 and No. 0000 should not be less than 12 in. in length for both round and grooved wire except in catenary construction, where a shorter type ear seems satisfactory. The committee finds no available data from which to recommend definite length of ear for each size of wire.

4. What factor of safety is allowed in insulating value for transmission line insulators?

The committee recommends for wood-pole

*Presented before the Central Electric Railway Association convention at Cedar Point, Ohio, July 19.

construction an insulator with nominal rating 30 per cent above the line voltage. For metal-pole construction an insulator with a nominal rating next higher than that used for wood-pole construction. Climatic conditions and geographical location will also influence the selection of insulators.

It has been suggested to the committee that interconnection to an extensive transmission system backed by a large source of power might call for an increased insulator rating, and it is therefore recommended that this phase of the question be further investigated.

5. Which trolley wire has proved most satisfactory, round or grooved? What size?

The committee recommends for heavy interurban service No. 0000 grooved trolley wire and for light interurban service No. 000 grooved wire and for city service No. 00 round wire.

6. What is the most practical and economical length of span for power transmission lines carrying up to 33,000 volts on wooden poles?

The factor of safety and details of construction as required by regulatory authority should be carefully observed in design and construction of transmission circuits. When these requirements are met the most economical line is that which will have the least fixed charge and maintenance costs.

In general the following has become the practice with many member companies on transmission lines carrying up to and including 33,000 volts on wooden poles. When used jointly for trolley span or bracket construction the transmission span is 200 ft., and shorter intermediate poles are set to assist in supporting trolley wires. On other than above types of construction span length for wood-pole lines should not as a rule exceed approximately 250 ft. on single-pole construction. On H frame or steel-pole construction greater span lengths may be used.

7. What has been your experience on high-voltage transmission lines with two- and three-piece porcelain insulators of same voltage rating?

Applying this to pin-type insulators of 22,000, 33,000 and 45,000-volt service, the committee favors a two-piece insulator if properly designed.

8. What type of lightning arrester is most efficient for protection of cars, power stations and substations, and what maintenance do they require?

This question refers, as we understand it, to protection of d.c. feeders and car equipment, and for this electrolytic arresters inspected periodically and following all severe storms are recommended.

9. What are the advantages, if any, in the use of overhead ground wire for high-voltage transmission lines? (a) What kind of wire is used? (b) How installed? (c) Method of grounding.

The committee is of the opinion that the use of an overhead ground wire properly installed will eliminate the majority of insulator failures and interruptions due to electrical disturbances and is justified from an operating standpoint.

(a) It is recommended that wire be noncorrosive, preferably of copper or copper clad and of greater tensile strength than line conductors and never smaller than No. 4 AWG.

(b) Preferably on bayonet, for single-arm construction and supported by an insulator of not less than 6,600-volt rating. On two-arm type of construction ground wire should be supported by insulator or pin in end pin hole of top arm.

(c) The aerial ground wire should be connected to earth at intervals not greater than 500 ft. The wire used for this purpose preferably should be copper and effectively grounded and should not come in contact with any of the pole-line hardware.

Report of Car Equipment Committee

1. (a) Have any of the companies experienced difficulty with 9¼-in. hub on steel wheels in boring out for 6½-in. or 7-in. axles? Have any companies been able to secure larger hub?

(b) On 26-in. wheels are companies able to secure a 3-in. or 3½-in. interurban flange and tread?

(a) No actual breakage has been experienced with the 9¼-in. hub but most of the mechanical men feel that the hub is too small for the bore of the axle. This matter has since been taken up with the American Electric Railway Association, and a 10¼-in hub has been adopted and companies should have no further difficulty in getting the larger hub.

(b) This is not a standard wheel but the committee has taken up the matter with various wheel manufacturers. One firm at the present time agrees to furnish this wheel.

2. (a) What is the minimum length of trolley pole that can be used for 22-ft. and 24-ft. trolley height, taking into consideration the various heights of cars? (b) Is it possible to standardize length of trolley pole? (c) What tension should be used on trolley pole for various heights of trolley wire?

(a) Trolley pole length should be figured for car and wire heights. A pole riding wire at an angle from 45 to 60 deg. with car roof gives very good service.

(b) Cars of the same height can use a standard length pole, but a standard for the field at large cannot be established. The committee is of the opinion that this subject should receive further consideration and a report be rendered at a future date.

(c) Trolley pole tension can be determined best locally due to the fact that the overhead trolley construction, the condition of track and condition of rolling stock all affect the trolley tension. The committee recommends the subject be given further consideration.

3. (a) What are the relative merits of the sliding contact shoe as compared to the standard trolley wheel? (b) State average life and mileage of both trolley wheel and contact shoe?

(a) The shoe has greater area of contact, making a more efficient current collector. Rides the wire better than the wheel. Makes less noise and less vibration at high speed. Less tension required on trolley pole. Causes trouble when running backward.

(b) Wear on trolley wire not determined. Tests show 60 per cent greater mileage with shoe as compared to trolley wheel.

In view of the fact that the shoe is still in an experimental stage, the committee recommends that same receive further study.

4. What experience have you had with building up flanges by electric welder on city cars? On interurban cars? What is the cost of building up such flanges? How much extra mileage can be obtained in this manner? What is your method of building up flanges?

The committee has found that a few roads have been apparently successful in building up flanges by the welding process on steel wheels. A number of roads have reported as failing to obtain results worth while. It is believed that equipment available and experience of operators during such welding has been responsible for discouraging results in a number of shops. We believe the subject has sufficient merit to justify additional study.

5. What is the average life of brush-holders on ventilated motors and non-ventilated motors?

No definite figures were obtained as to the average life of brush-holders, but it was agreed that all cars with the ventilated type of motors wore out brush-holders and also the brushes more rapidly than the non-ventilated.

6. What saving, if any, can be made in the wiring of cars by the use of flexible metallic conduit as compared to rigid conduit? What saving can be made in insurance costs if underwriters can be induced to accept flexible conduit at the same insurance rate as the rigid?

The committee does not recommend the use of flexible metallic conduit for power wiring, as it has been found too light for motor work. It can be used for light wiring and a saving made in installation costs. No difference in insurance rates has been expressed as it has been approved by the fire underwriters.

7. What are the relative merits of tin base vs. lead base metals for bearings?

The committee recommends tin base metal for motor bearings, lead base for journal bearings and brass for axle bearings.

9. What is the effect on motor and gear maintenance of too much wear on body and collar of axle bearing? (a) What is permissible wear on the body of axle bearings? (b) What is permissible wear on collar of axle bearings?

Excessive wear on collar or flange of axle bearings permits the motor to lunge from side to side as the car hits sharp curves or sways from side to side. This aggravates the condition, causes the armature to pound its bearings and causes sparking at the commutator. It permits misalignment of gear and pinion faces, resulting in more rapid and uneven wear of both and increases the liability of tooth breakage due to the uneven surface worn across the face of the teeth.

Excessive wear on the body of the axle bearings allows the gear centers to spread. This increases the wear on gear and pinion teeth and in extreme cases might permit the gear and pinion to disengage. After a little wear, the tooth loading is all thrown upon the tips of the teeth, which results in tooth breakage if allowed to continue for any length of time.

(a) It was agreed by most of the roads that good practice allowed about from $\frac{1}{8}$ to $\frac{3}{16}$ in. wear on the body of the bearing.

(b) It was agreed that the flange wear was not as vital with the main body of the bearing but that this was easier to keep maintained so that it was thought that the maximum allowance should be about from $\frac{1}{8}$ in. to $\frac{1}{16}$ in. as this is a very easy and inexpensive matter to adjust.

10. There has been but little improvement in design of gear cases for twenty years. What suggestions for improvement in this design are recommended?

This question has been thoroughly discussed and no definite suggestion in designs have been developed.

11. What effect, if any, does fast controller feeding have on equipment?

Effects are most noticeable in city service where frequent stops occur with close headway of cars. Generally too rapid notching causes more equipment failures and increases maintenance cost. On short runs fast controller feeding frequently is one cause of overheating of motors. The tendency of some motors to flash is also increased because the motor is saturated magnetically from the high accelerating current while the rapid notching imposes sudden and wide volt variations in motor. Excessive heating dries out the insulation, causing loose bands and windings. The excessive accelerating currents set up magnetic stress which produce severe mechanical strains in the winding and cause armature leads to break. Gears and pinions are affected. Controllers wear out contacts and fingers unduly because of excessive current handled. Circuit breakers operate more frequently. Flickering of car lights becomes a source of annoyance to passengers.

12. What is the best practice for making emergency stops to avoid accidents?

By tests made very recently by a committee of the Central Electric Railway Association it was found that up to 15 m.p.h. reversing the motors was most effective. For speeds greater than 15 m.p.h. the use of the air brake was more effective. (See report of special committee on emergency stop test, printed in this issue.)

13. Should the Engineering Council pass upon the merits of new equipment or devices submitted by manufacturers for test?

Yes, in so far as they have facilities and equipment.

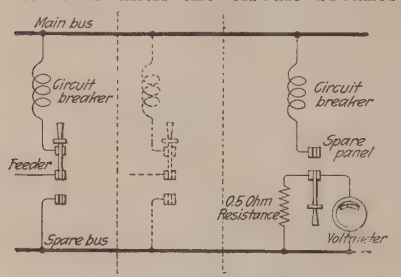
Maintenance of Equipment

Test Resistance Reduces Breaker Maintenance

By G. H. McKelway

Engineer of Distribution Brooklyn-Manhattan Transit Corporation

WHEN a ground causes a reclosing circuit-breaker to open, the line can be made alive as soon as the ground has been cleared; or when the breaker opens because of an overload it can be closed immediately. With a manual circuit breaker, however, this cannot be done. The general practice to test the line after an interruption is to close the breaker. If it stays closed it proves there is no ground, while if it opens again a ground is present. The usual procedure is to wait perhaps a minute and then try again, repeating at intervals until the circuit breaker



Circuits for Test Panel to Indicate Grounds

stays in or word is received that there is trouble and the line is to be left open until further orders.

Testing in this manner is very hard on the breaker, as the heavy current must be broken repeatedly in case of a ground. A bank of lamps or a voltmeter cannot be used to test for a ground, since the car lamps, or sometimes the controllers on the stalled cars, are usually turned on so the car crew will know when power is restored.

In order to determine if it is safe to close the switches and pick up the line after the circuit breaker has blown, and yet save the breakers from abuse, one large company is making use of what it terms a "test resistance." The switchboards of this company have two positive buses, one of which is used regularly, the other being used only for transferring a feeder from its usual circuit breaker to a spare one mounted on a separate panel. Each of the regular panels has a double-throw switch, with the outgoing feeder terminal attached to the center stud. The main bus is connected to the upper stud through the circuit breaker, and the spare bus is connected to the lower stud.

The center stud of the spare panel is connected to the spare bus through a resistance of about 0.5 ohm. By throwing the feeder switch down the feeder is connected to the spare bus, and through the resistance to the switch of the spare panel and thence to the circuit breaker on that panel and to the main bus.

The resistance limits the current with a dead ground to a little more than 1,000 amp., an amount that can be broken without damage to the breaker. A voltmeter is connected so as to measure the drop across this resistance, by which means the station operator can see whether the line is grounded. In case it is, he opens the breaker and tests the line a little later, the comparatively small amount of current flowing through the resistance being insufficient to trip the breaker automatically. If a low reading of the voltmeter across the test resistance indicates that but little current is flowing, it is safe to pick up the line again on the regular circuit breaker.

By the use of this test resistance, the feeder breaker has to endure the strain of opening under a heavy overload but once for each short circuit, since thereafter the load is transferred to the spare circuit breaker; and the current flowing into the feeder is limited by the resistance.

Motor Truck Facilitates Track Welding and Bonding

THE Newport News & Hampton Railway, Gas & Electric Company has rigged up a portable welding outfit which facilitates bonding and rail-welding work. A General Electric motor-generator welding outfit is mounted in a light truck,

A "Close-Up" Which Shows the Details of the Bearings and Electric Contact Device

which also carries, just inside the tailboard, a pair of reels for the positive and negative cables.

One end of each cable is connected to an insulated sleeve projecting from the end of the reels, to which current is fed through a band contact device. The band is held close around the sleeve by means of a light

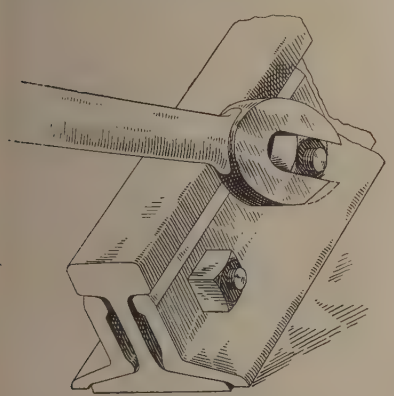
This Truck Renders the Welding Outfit Highly Portable

By Means of Cables Wound on Reels, the Outfit Is Given a Wide Range of Action

spring which presses together two angles attached to the end of the band. The reels are supported on angle-iron stands of inverted U-form.

Modified Track Wrench

IT HAS been found advantageous by the Municipal Railway of St. Petersburg, Fla., to grind off a portion of the wrench used in tightening track bolts, as shown in the accompanying illustration. Where a square nut is used with bolted joints on low T-rail, the track wrench is likely to become worn where it comes in contact with the base of the angle bar. If the wrench is tempered sufficiently so that it does not wear out, it will often chip off at the point. The difficulty has been overcome on this railway by grinding down one side of the wrench. Both sides of the wrench are not ground down, as it is felt that to do so would weaken



Clearance for Turning Nuts on Low Rail by Grinding Off Wrench

it. After the wrench has been modified it is used in one direction only, because one side is stronger than the other. It may occasionally be reversed, but should not habitually be used in that way.

Convenient Home-Made Coil-Winding Machine

A SHOP-CONSTRUCTED machine for winding armature coils is used by the Lehigh Valley Transit Company, Allentown, Pa. The head for holding the coils has convenient hand screws and plate attachments and, in addition, provision is made for rotating the head so that it is unnecessary for the operator to leave his place in order to get a more advantageous working position. The head is locked and unlocked by operating a pedal which has a connecting rod attachment, with a bellcrank lever working the locking rod in and out of the head portion. When the pedal is depressed the coil fixture can be rotated as desired.

Home-Made Armature Coil-Winding Machine

The Air Brush Is Supplanting the Hair Brush

BY DENNIS O'BRIEN
Foreman Painter Brooklyn-Manhattan Transit Corporation

AN AIR-BRUSH or paint-spraying machine has been used for applying paint to car trucks, under bodies of passenger cars and miscellaneous equipment for a considerable time. The air brush, however, was not used with any great success as a vehicle to be used in applying the finishing coats to the body of the cars until quite recently. While the air brush will never entirely supersede the hair brush, it is and must be recognized as a valuable adjunct to the paint shop and the greatest contribution engineers have ever given to the paint trade.

The economic value of the air brush cannot be overestimated. Its use reduces the cost of car painting from one-third to one-half of the cost of painting by the hand-brush method. The savings on two actual jobs show its true economy. On a 28-ft. body, semi-convertible inclosed vestibule type of car, the time consumed by hand-brush enameling the exterior of body (long oil heavy bodied para red enamel) was nine hours (piece work). The actual time taken with an air brush for the same job was four and one-half hours, a saving in time of 50 per cent.

Let us make an analysis of the operation and see what is saved in varnishing 420 sq.ft. of surface:

	Labor	Varnish
Hand brushing 420 sq.ft. at $0.65 per hour	$2.60	$3.00
Air brushing 420 sq.ft. at $0.65 per hour	.65	3.60
Labor saving by air brush	$1.95	
Additional cost of varnish		$0.60

By subtracting the 60-cent additional cost of varnish from the amount of labor saved by use of the air brush we find a saving of $1.35 for the operation. The amount of material used is about 20 per cent greater with the air brush over the hand-brush job, but it does not follow that this 20 per cent of material is wasted. It is true that in the process of atomizing some of the material goes into the atmosphere, but the greater portion of the additional material adheres to the surface being painted or varnished. You will find more enamel and varnish on the floor of the paint shop where they still use the hand-brush method than you will find in the shop where the air brush is used.

The question uppermost in the mind of the man about to adopt the air-brush method for painting is: What outfit is best for the particular line of work? There are a number of outfits in the market today, each with some individual feature not contained in the others which impresses the buyer.

Several types employ a needle valve to take care of the viscosity of the materials. The needle valve requires adjusting, and for that reason some foremen painters do not favor it as they feel that a new man being introduced to the air-brush method of work cannot be trusted to make adjustments on the machine.

One outfit has no needle valve; the viscosity of the material is cared for by five different sizes of fluid parts through which the material passes. These fluid parts resemble cartridges. Each part is made to satisfy the viscosity of material, from a japan color to the heavy body paints or enamels. These fluid parts can be attached or detached in an instant and no adjustments are required. In addition to the fluid parts there is an oil and water separator attached to the material tank, thus insuring free, clear, clean air.

Another feature of importance in spray painting is the type of container used to hold the material.

Small railway properties often use several different colors on the car body and so do not favor a container that must be cleaned out after each color.

Any paint, enamel or varnish that can be hand brushed can also be air brushed. Obnoxious fumes and excessive vapor can be overcome by the paint or varnish maker. A pure turpentine spirit instead of turpentine substitutes, or vegetable oils, made soluble in mineral turpentine and called pure turpentine, used by the varnish manufacturer will do a great deal toward eliminating excessive vapor. The less the amount of volatile matter and the purer the volatile the less vapor and fumes.

There may be some objection to using white lead with the air brush due to lead poison or painters' colic. Lead poison or painters' colic is classified as an occupational disease by the workmen's compensation boards and as such leaves the employer liable. White lead is not the only and best white pigment, however. Oxide of zinc will do all that white lead will plus a greater permanency of color and it is not a poison.

Lithopone for interior work is far superior to white lead and is not poisonous. In roof or floor paints where the basic pigment is silica, china clay, or barytes, it is advisable to use metal-lined material hose. These paints on account of their peculiar pigmentary structure and stony nature act like an abrasive and readily destroy any hose which is not metal lined. The ordinary rubber material hose is satisfactory for use of other paints or varnishes.

Air-brush manufacturers recommend using thinners in the paint. I am opposed to thinners in any paint. Enough air pressure will make the air-brush function; thinners and extenders tend to destroy paint and cause a vapor which would never otherwise be there. I don't quite agree with those who hold that any Tom, Dick or Harry can be taught to use the spray in jig time. The better the painter the better the air-brush job.

Sags and ugly runs are caused by operating too close to the surface being painted. The air brush should be held and operated from about 8 to 12 in. away from the surface. The painter learning to operate the air brush should in the beginning carry a hair brush to pick up sags and runs. This will be for but a short time as he will soon become adept. The painter operating the air brush should also be furnished with a respirator and goggles. The respirator can be of light aluminum with a moist sponge and the goggles the standard safety make. The glass in the sash of the cars can be protected from an accumulation of paint and varnish by shop-made window shields.

New Equipment Available

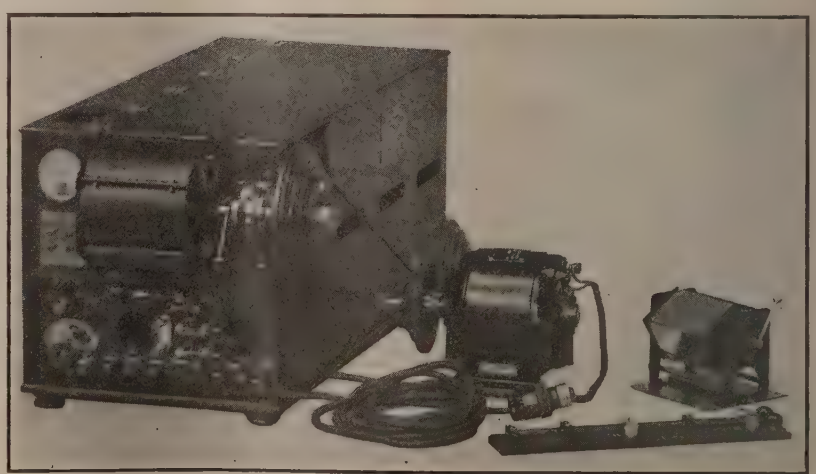
Portable Three-Element Oscillograph

TO MEET the increased need of electric railways for an oscillograph outfit which is readily portable and which will work satisfactorily on a moving car, the Westinghouse Electric & Manufacturing Company has recently brought out such an instrument. The new oscillograph is compact and portable and is more easily operated than previous types.

The instrument consists essentially of an instantly responding moving coil galvanometer and an optical system to cast a beam of light on the vibrating mirror from the galvanometer, from which it is reflected to a photographic film passing at right angles to the vibrating beam. This gives a current-time record on the film in which distance along the film is proportional to the time, and the deflection is proportional to the instantaneous value of the current passing through the galvanometer vibrator.

This new oscillograph galvanometer actually consists of a single turn of very fine conductor supported by two ivory bridges so that the effective part of the coil is essentially two parallel wires with the current passing down one wire and up the other. This coil is located in a strong magnetic field. The motor action of the conductors carrying a current at right angles to the lines of force of the magnetic field tends to force one wire forward and the other backward in proportion to the current passing through them. These parallel conductors are kept very taut by a tension spring which transmits its force to the loop through a lever and tiny ivory pulley. A very small mirror bridges the parallel conductors at the center of the magnetic gap. This reflects the beam of light to the photographic film, the deflection being proportional to the instantaneous current in the conductors. Any vibrator element may be connected across a shunt to record instantaneous values of line current, or it may be connected through a series resistance to act as an instantaneous voltmeter.

The new oscillograph is complete in one unit except for the motor and film holder. The main unit is 11 in. wide, 11½ in. high, and 25 in. long, and includes the entire optical system, special incandescent lamp, sensitive three-element galvanometer, complete control equipment for vibrator elements, transformer for operating lamps and motor, and control for galvanometer field. There is also a "Rectigon" for charging the galvanometer-field storage battery and a set of busbars, fuses and for controlling the apparatus.



Three-Element Oscillograph with Motor and Film Holder Attached

The News of the Industry

Wage Rise in Chicago

Arbitrators Decide Surface Men Shall Have 3 Cents More Now and 2 Cents More Next Year

Employees of the Chicago Surface Lines will receive a wage increase of 3 cents an hour for one year, retroactive to June 1, and an increase of 5 cents an hour from the present rate for the year beginning June 1, 1924.

This is the award made by the arbitration board which settled the wage dispute between the union men and the railway. It means that conductors and motormen, who have been receiving 70 cents an hour, will be paid 73 cents during the current year and 75 cents an hour next year. The increase will add $1,200,000 to the company's payroll in 1923 and $2,000,000 in 1924.

The wage increase applies to about 11,000 trainmen and 3,000 employees in various other departments. The only groups excepted from the pay boost are substation operators, maintenance of way men, linemen and wreck wagon men. The wage advance affects conductors, motormen, mechanics, who are members of the carmen's union, electricians, car repairers, "dopers" (men who grease cars), shopmen, body repairers, washers and many others. These classes are working under various wage scales, but all will get the same increase per hour.

The men had demanded an increase of 10 cents and hour and a strike was narrowly averted by Mayor Dever, who succeeded in getting both sides to agree to arbitration and to accept a wage scale which would be binding for two years. The pay boost sought by the men would have added $4,000,000 to the company's payroll.

Arbitration of the wage dispute between the union men and the Chicago Elevated Railroads began on July 26.

The decision in the case affecting the wages of the surface line men was hailed by all concerned as a great victory for arbitration. Both sides were pleased with the speed with which the hearings were conducted and the rapidity with which the award was made. While union representatives were disappointed that the wage increase was not greater, they accepted the ruling of the arbitration board and the company officials announced that they will carry out the provisions of the award. It was stated that no request for a fare increase will be made of the Illinois Commerce Commission unless the increase in operating expenses forces it.

The hearings began on July 9 and the presentation of evidence actually consumed only nine and one-half days. Francis X. Busch, who acted as umpire of the board, said:

> This is, I believe, a record for the country. In 1912, the traction arbitration dragged through three months here. Employees naturally had set up the cry that mediation was a subterfuge through which they were "stalled" for an unreasonable time. We have dissipated this conclusion, we believe, and much credit for the achievement is due to William D. Mahon, international president of the carmen's union, for his willingness to arbitrate.

Mr. Mahon issued a statement accepting the award without reserve and stating that the cause of arbitration had been helped very materially by the prompt action of the board. He said:

> We accept the award in the same spirit that we have always accepted arbitration awards and mediation agreements. The award will be carried out faithfully.
>
> I regret that the board could not get our viewpoint and award us the 80 cents an hour that we sought. However, I realize that the board has not only taken into consideration the contentions of the men and the company, but also considered the public's interest, which lies in the rate of fare question.
>
> As to the arbitration and the manner in which it was conducted, I want to congratulate the board and especially Chairman Busch. For a big arbitration, involving as many men as this one did, it was carried through and finished more satisfactorily and more quickly than any other arbitration with which I ever had anything to do. During the arbitration he made both sides eliminate all unnecessary evidence, and in that way hastened and brought forth an award speedily. If arbitration in disputes of this kind is to be successful that policy must be followed.

The cost of living and the trend of wages in industry were the chief factors considered in the arbitration proceedings. William Levine, representing the unions, submitted a budget intended to show that men with families of five, said to be the average, could not live decently on less than $2,214 a year, which would be their income at 80 cents an hour, working eight hours a day through 313 days. The companies' attorney placed against this the so-called Washington budget, brought up to date, which would allow $1,302 a year for a family of five.

Company Not in Default on Improvements

Cincinnati Traction Denies Charges Made by Street Railway, Which It Operates Under Lease—Refinancing Plan Details Made Public

AN EMPHATIC denial was expressed by the Cincinnati Traction Company on July 20 of the charge that it was in default to the extent of $4,000,000 in repairs and renewals to the properties of the Cincinnati Street Railway. The reply of the traction company to the street railway is the result of a letter sent to the traction company by the Cincinnati Street Railway on April 23, in which the latter company requested the lessor company to make repairs to its properties to the extent of $4,000,000 or surrender its franchise. The claim of the railway is based upon a survey of the property made by the engineering firm of Stone & Webster, Inc., Boston. In its reply the traction company contests this claim to a large extent and produces figures of its own to show that the $4,000 000 is greatly in excess of the actual sums needed to put the property in first-class condition.

Following receipt of the reply, the special committee of the Cincinnati Street Railway announced that it would move for arbitration of the controversy. Under the terms of the franchise each company has thirty days in which to name an arbitrator, the two arbitrators to choose a third.

The traction company contends that the city of Cincinnati is responsible for the situation, because under the service-at-cost franchise passed by Council on Aug. 23, 1918, the city administration received full authority over all expenditures to be made by this company for maintenance, repairs, renewals, additions and betterment of the property. Furthermore, the traction company held that it had combined in all respects with the terms of the service-at-cost franchise and in additions has expended money upon the property as permitted by the city's Street Railway Director, who under the terms of the franchise has full regulatory jurisdiction over the street railway system of Cincinnati and its operating companies.

The traction company says that the report of Stone & Webster, Inc., did not take into consideration conditions that it holds are vital to the question at issue. A considerable amount of trackage that the report declares should be renewed has been or is to be abandoned and in such cases the traction company contends there is no occasion to go to the expense of renewing such tracks. This also applies to the power stations that were discontinued when the traction company arranged to buy a large percentage of its current from the Union Gas & Electric Company. Further, the contention is set forth that it is impossibe for the company to go ahead with new track replacements except where the city is ready to renew the streets in which these tracks are laid. The traction reconstruction program must of necessity wait on the

city's street reconstruction program. In view of this situation it is said to be impossibe to make all the replacements demanded this year, and in any circumstances such program would have to be extended over a period of years to comport with the city's program.

In furtherance of its refinancing program, the Ohio Traction Company, which owns the entire capital stock of the Cincinnati Traction Company, filed for record a mortgage to secure a bond issue of $4,400,000 in which the Union Trust Company, Cincinnati, is designated as trustee, the mortgage covering all of the properties of the Ohio Traction Company subject to a prior mortgage to the Fidelity Trust Company, Philadelphia, March 1, 1911.

It was announced that $2,648,000 of new bonds will be issued at once to refund the 7 per cent notes of the traction company which matured on Jan. 1 last, but which were extended to Oct. 1 next, of which there are still outstanding about $700,000.

William Jerome Kuertz, City Director of Street Railroads, explained that the 6½ per cent bonds which the Ohio Traction Company announces it will issue to refund old debts will require no further authorization from his department nor from the Ohio Public Utilities Commission. The issue was provided for in 1920, when the Utilities Commission and W. C. Culkins, then Director of Street Railroads, authorized the issuance of 7 per cent short-term debentures to take care of outstanding obligations.

The mortgage given by the Ohio Traction Company is designated as a general and refunding issue securing twenty-five-year convertible gold bonds, all bearing interest at 6½ per cent per annum. The bonds will run to Dec. 31, 1945, with interest payable semi-annually in January and July.

The Ohio Traction Company conveys under this mortgage to the Union Trust Company, trustee for the bondholders, all its system now owned or hereafter constructed or acquired in Cincinnati, including the line to Hamilton, and as further security pledges 14,995 shares of capital stock of the Cincinnati Car Company of the par value of $100, aggregating $1,499,500 and being all the capital stock of said company, except five shares. It also pledges 19.989 shares of capital stock of the Cincinnati Traction Company of par value of $1,998 900, being all the capital stock of said company, except eleven shares. The mortgage also covers the Traction Building, located on the corner of Fifth and Walnut Streets. The mortgage is made subject to a mortgage of March 1, 1911, made to the Fidelity Trust Company, Philadelphia, to secure a bond issue of $2,500,000.

The letter of the Cincinnati Traction Company to the Cincinnati Street Railway was signed by W. Kesley Schoepf, president. After referring to the several communications between the companies and to the charges that were made, Mr. Schoepf said:

This company denies that any condition exists which would constitute a default, under the above mentioned lease, as claimed in your first letter of April 20, 1923, with Exhibits A, B and C attached. Your before mentioned communication is the first and only complaint received from you as to the condition of the street railway property leased from your company during the twenty-one years of this company's operation.

On Aug. 23, 1918, the Council of Cincinnati passed Ordinance No. 253-1918, revising the terms and conditions of the grant from the city of Cincinnati to the Cincinnati Street Railway, adopted by the Board of Administration of the city of Cincinnati on Aug. 13, 1896. Your company was represented by its officers and legal representative throughout the negotiations of the terms and conditions to be embodied in the revision of the franchise, which was considered in public meetings in the Council chamber, and after its passage said Ordinance No. 253-1918 was formally accepted by your company.

No complaint was made about or of the condition of the property leased from your company at the time of the passage of the revision ordinance, and since then it has been continuously maintained and operated under the terms of said ordinance.

This ordinance, which you accepted and the terms of which you agreed to, provided, among other things, that the city of Cincinnati was clothed with full authority over all expenditures to be made by this company for maintenance, repairs, renewals and additions and betterments to the property, and this company has complied in all respects with the terms of said ordinance and has expended upon the property leased from the Cincinnati Street Railway all sums required or permitted to be expended by the city of Cincinnati and shall continue to do so throughout the terms of the franchise.

Purchase Contract Terms Drawn

Special Committee Ready to Report on Milwaukee Service-at-Cost Arrangement

F. W. Luening has been contributing to the Milwaukee *Journal* a series of signed articles on the matter of the contemplated purchase of the local railway lines and light property there by the city, brief mention of which was made in the ELECTRIC RAILWAY JOURNAL of July 21, page 114. The exact terms of the proposed contract will not be made known until the ordinance covering the matter has been introduced in the Council, but the general provisions have been discussed publicly. Mr. Luening says that members of the acquisition committee consider the tentative contract highly favorable to the city and believe its terms should be accepted by the municipality. It also is said that they have endeavored to correlate the views of those who favor municipal ownership, those who favor municipal control, and those who favor private management. They have established a mutually agreeable arrangement whereby the property will continue to be privately managed, municipally controlled, and ready for municipal purchase if, after a period of trial the people of Milwaukee should desire to make such a purchase.

In commenting on the valuation matter Mr. Luening said:

The property value of the Milwaukee Electric Railway & Light Company, as appraised by the Railroad Commission in 1914, was $35,805,654. The value of the Milwaukee Light, Heat & Traction Company property, as estimated by the Railroad Commission in the same year, was $15,426,105. This gave a total combined value of $51,231,754, from which was deducted depreciation and other items bringing the total down to $43,871,530. There have, however, been additional investments since this appraisal was made and for this reason additions to the total have been agreed to.

It is said that the contract provisions will include:

1. Management shall remain with the company, but the character and quality of the service shall be prescribed by the city.
2. Street car fares may fluctuate, from a possible minimum of 4 cents to 5 cents, to a probable maximum of 8 cents. The fluctuation will be automatic and will be controlled by a "stabilizing reserve fund."
3. The company will be required to make extensions in its railway system, light and power lines whenever and wherever ordered to do so by a three-fourths vote of the Common Council; but if such extensions are arbitrarily ordered by the city and should prove ill-advised and unprofitable, the city will pay the actual cost of the extension, but ownership of them will thereafter rest with the city.
4. The city may participate in the financing of the company by purchasing its bonds, junior to all outstanding bonds or liens, as of Jan. 1, 1923.
5. A "city equity fund" also will be established to which will be credited any amount exceeding necessary requirements in any of the company's reserve funds.
6. A public utility commissioner will be appointed and the cost of his department, not exceeding $60,000 in the first year, is to be considered part of the operating expense of the company.
7. The commissioner will be named by the city. His department will constitute a kind of local railroad commission and will be the instrument through which the city will exercise its rights in public utility properties.
8. Matters of disagreement or dispute will be submitted to a special arbitration board or the Railroad Commission, if so elected by the city. However, the city's right to control and demand service shall not be subject to arbitration nor shall the stipulated rate of return to be allowed the company be arbitrated.
9. The company's relation with its officers and employees will not be disturbed.
10. The proposed contract will continue ten years and may then be terminated, but only if voted upon by the people during the eighth year. Unless rejected by the voters the contract will automatically continue for ten-year periods thereafter.

The committee on acquisition was organized by resolution of the Common Council on Feb. 24, 1919. Its members are Fred S. Hunt, chairman, president of the Milwaukee Dustless Brush Company; William E. Black, attorney and member of the firm of Upham, Black, Russell & Richardson; J. J. Handley, secretary, Wisconsin State Federation of Labor; Lyle H. Olson, general manager of the American Appraisal Company; J. W. Radke, Albert Janicki and John Doerfler, Jr., members of the Common Council, and M. E. Glaser, secretary of the committee.

The committee began its work almost immediately after organization. It undertook an analysis of the company's operations, its investments and all that related to street railway, light, heat and power service in Milwaukee.

It compiled a report that includes hundreds of pages of typewritten matter and hundreds of charts, maps and diagrams. It prepared a summary report in printed form July 25, 1921, submitting it to the Common Council. In that report it was able to offer a mass of historical data, but was not ready to announce conclusions. It suggested, however, that a contract with the North American Company—the company owning or controlling the local property—would be needed and that in such contract agreement might be reached whereby Milwaukee could receive its electric service at cost, while private

management could still receive a fair return on its investment.

Following the submission of this document, the committee was instructed by the Council to continue its work. This it has done in the intervening period.

Mr. Luening said of the future:

It is said that there are only minor details awaiting adjustment and that the acquisition committee and the North American Company undoubtedly will be able to reach an agreement in the next few weeks. It is admitted, however, that the remaining details are vital and relate to the exact amount in profits, or returns for managerial services, to be allowed the North American and local company.

If these final details can be consummated, it will remain for the Common Council to accept the proposals outlined in the contract and thereafter submit them to the people at a special election.

Electrification Rumors Premature

Recent reports in the daily press regarding possible electrification of the Santa Fé were based on rumors of a study made for electrification of one of the divisions of that company in the Western desert country. From authoritative sources it is learned the company has no work of this kind under consideration to be carried out in the near future. Like most of the other roads operating out of Chicago, the Santa Fé has reports of one kind or another on electrification possibilities, but these are only preliminary studies that mean nothing but a basis for possible future improvements. Probably every road in Chicago has in hand preliminary plans looking toward electrification of the terminals there, but the Illinois Central plans are the only ones that so far have been reduced to anything like tangible form in carrying out.

Arbitrators Named for Cincinnati Wage Issue

The board of arbitration has been selected which will hear the demands of employees of the Cincinnati Traction Company for a wage increase. The members are former United States Judge John Weld Peck, selected by the traction company; Attorney James H. Vahey of Boston, selected by the employees, and former Ohio State Supreme Court Judge Joseph W. O'Hara, selected by the two other members. Under the terms of the present agreement between the company and the men the decision by the board of arbitration will be final and binding upon both sides. The present scale is 42 cents an hour for the first three months service with the company, 46 cents an hour for the next nine months and 48 cents an hour after one year. The platform men (conductors and motormen) are asking for an increase of 17 cents an hour for all grades. The carhouse men, numerically a small proportion of the company's total employees, are asking for a 35 per cent increase. The present wage scale expired June 30, but under the terms of the agreement the existing wage shall be paid until a new agreement is reached.

Strike of Electrical Workers Settled in St. Louis

The strike of 175 electrical workers of the United Railways, St. Louis, has been settled. The men returned to work on July 25 agreeing to negotiate further with the receiver. This means a return to conditions of a week ago when they walked out over the demand for 92 cents an hour. The present scale is 78 cents. The receiver offered 83 cents and the men's final demand was 87. They rejected arbitration. The deadlock lasted six days. On July 25 Manager Perkins delivered an ultimatum in which he said he would fill the men's places and not negotiate further unless the men first returned to work. He gave a twenty-four-hour time limit. The men voted to return. Meantime service has not been interrupted. The office force and foremen have manned the power stations and line work.

Ford to Electrify D., T. & I. Road

Plans are under way for the electrification of Henry Ford's Toledo & Ironton Railroad, running from Detroit, Mich., to the Ohio River. This is indicated in an article printed in the "D., T. & I. News," official publication of the railroad. The power will be supplied from Ford's Rouge River plant, the capacity of which is to be greatly enlarged.

The article in the "D., T. & I. News" concerning the electrification of the road follows in part:

The present plans call for the building of new locomotives, the doubling of the power capacity of the Rouge River plant, which will furnish power for the first division to be electrified, and the construction of 13¾ miles of double track between the Rouge River plant and the Flat Rock yards.

In keeping with the general improvements that the Detroit, Toledo & Ironton Railroad has undergone under Ford ownership, electrification will give the road a vastly superior motive power.

The new electric locomotives for the D., T. & I. railroad for freight service will weigh 360 tons, have a normal capacity of 4,000 hp. and be capable of producing 5,000 hp., for an hour. They will have sixteen axles and will develop 108,000 lb. drawbar pull at 25 m.p.h.

Transit Company Ready

T. E. Mitten, chairman of the executive committee of the Philadelphia Rapid Transit Company on July 17 definitely pledged his company to the operation of the rapid transit lines comprised in the comprehensive plans agreed upon by the engineers of the city, the company and the central business interests. On the question of terms under which operation is to be undertaken, Mr. Mitten stated that he was unable to make any definite proposal until the completion of the traffic check.

A significant development at the meeting of the Councilmanic Transit Commission on July 17 was the announcement by Mr. Mitten that if the city would, in addition to "Step No. 1," undertake the construction of a surface subway on Chestnut Street, to enable the removal of the present surface tracks on that street and on Walnut, the railway would contract to pay during the lifetime of the city's bonds the full amount of the required interest and sinking fund. This would mean that with an assured return from the outlay the $18,500,000 estimated cost of the surface subway would not have to be counted against the city's borrowing capacity. The advantage of this was so obvious that the commission, by unanimous consent, added this feature to its "Step No. 1," final adoption of which is on its program for its next session.

Two other important changes in the program for immediate construction were made, providing for a four-track subway on Broad Street for the full distance from Olney Avenue to Spruce Street, and for the modification of the Chestnut Street-Darby line by extending it as a subway west on Chestnut to Forty-second and thence on Forty-second to Woodland Avenue by an elevated structure, the remainder of the line on Woodland Avenue also to be elevated.

Key System Employees Accept Three Cents Increase

After twice rejecting the offer of the company, employees of the San Francisco-Oakland Terminal Railways (Key System) on July 7 voted to accept the company's proposition of an increase in wages of 3 cents an hour over the former scale. The vote was 444 in favor to 115 against.

The new rates for traction division motormen and conductors and Key division brakemen are 49 cents for the first three months and 52 cents for the next nine months and 56 cents thereafter. Key division motormen and conductors will receive 2 cents higher than the scale just mentioned. These rates, according to the company's original proposition are retroactive to June 1 and will remain in effect until May 1, 1924.

The trainmen of the San Francisco-Oakland Terminal Railways, comprising Division 192 of the Amalgamated Association, served notice upon their company for reopening their agreement as of June 1, 1923. After a number of conferences with the officials of the company, the company offered an increase of 3 cents an hour over the scale then in effect, which was for traction division motormen and conductors and Key division brakemen, 46 cents for the first three months, 49 cents for the next nine months and 53 cents thereafter.

For Key division motormen and conductors the rates were 2 cents higher.

At a midnight meeting held on June 9 the men rejected the company's proposition and after several more meetings, when the company continued the same offer unchanged, the men by a referendum vote on June 27 again rejected the offer. The company then officially notified the men that they would be given a chance to reconsider their former decisions, but that if the company's offer was again rejected the next step would be arbitration. This led to the men's acceptance.

Strike Looms in New Jersey

Railway and Employees Fail to Agree Upon Means of Arbitration to Avert Walkout Threatened Aug. 1

"We are through holding the bag" said Thomas N. McCarter, president Public Service Railway, at a meeting with the Mayors of twenty-five New Jersey municipalities held at the Newark City Hall on July 26 to try to arrange a means of arbitration acceptable to both sides and prevent a strike next Wednesday. "If the men stop work we will not import strike breakers or try to run the cars. Of course, it is possible that the cars will eventually run again by means of court action, reorganization or the like, but I mean it when I say that we are through."

He at first declined to consider arbitration by any board except one having power to increase the company's revenue to correspond with any wage increase recommended, namely, the public utilities commission. Later Mr. McCarter said he would agree to an arbitration board consisting of one man chosen by each side and Harry V. Osborne, head of the utilities commission, as the third member. But he left the meeting abruptly after a verbal battle with the Mayor of Jersey City.

Prior to this meeting the men had submitted a demand for 30 per cent increase in wages after the termination on Aug. 1 of the existing agreement, as told in the ELECTRIC RAILWAY JOURNAL last week. The present rate is 50 cents an hour. The railway had refused to accept such proposal but had offered to continue the present scale for five years more. This offer in turn was unanimously rejected at meetings of the various local organizations of the union.

Arbitration by the public utilities commission had been suggested by the company and refused by the men. The latter had suggested the selection of an arbitration board of three, one to be chosen by each side and those two to select a third. The railway, however, had declined to participate in this plan.

In the hope of getting the two sides to agree upon a method of arbitration, Mayor Breidenbach of Newark called a conference of representatives of the various municipalities served by the railway, officials of the company and of the union, to meet on July 26. At this meeting Mr. McCarter explained fully his position. Increased taxation, paving charges never contemplated in the original franchises, and automobile competition, particularly bus competition, have placed almost insurmountable difficulties in the path of the company. No dividends have been paid since 1917, he said, and a deficit of more than $1,000,000 has been accumulated.

According to Mr. McCarter, the Public Service Railway has no money to pay the increase asked, and is unwilling to submit the matter to arbitration by a board which might recommend higher wages, but would have no power to provide means to pay them. Arbitration under the terms previously stated is therefore, the only method to which the company will consent. The union, however, feels that the public utilities commission would not have the courage to make an award in favor of the employees because it might then have to authorize an increase in fare or cut down competition.

No progress toward arbitration was made at the Mayor's meeting because neither side would recede from the position which it had taken. Mr. McCarter said that he saw only three possible ways for the controversy to end: a higher fare, elimination of bus competition, or the collapse of the railway. As a result of the failure of this meeting it appeared at noon on July 27 that a strike was almost inevitable on Aug. 1.

Extensive plans are already being made to meet the transportation crisis if the railway stops operation on that date. There are about 1,500 buses now operating in the territory served by the railway, approximately 425 being in the city of Newark. The maximum number of cars operated on the entire railway system is about 1,450, of which 600 are in Newark. It is planned to import additional buses from neighboring states, and by a system of short routings as well as by the elimination of bus layovers, it is hoped that fairly adequate emergency service may be provided. In fact, many look upon this, if the strike occurs, as a test of what the bus can do. The bus men in Jersey are in a far better position to undertake the task of supplying emergency transportation that was the case in connection with suspensions of railway service in Toledo, Bridgeport and Des Moines.

Report of Possible Change in Voltage Premature

Rumors have been current that the Chicago, Lake Shore & South Bend Railway Michigan City, Ind., plans to change over to 1,500 volt d.c. operation. The reports are based on the apparent necessity of the company conforming to the Illinois Central Railroad system of electrification for its terminal lines into Chicago. The Chicago, Lake Shore & South Bend has gathered some information of possible value to it in any study which it may make in the future, but it is not planning any such change at this time. In short, the matter is wholy tentative and of no consequence in so far as the present is concerned.

News Notes

Convention Date Announced.—The Amalgamated Association of Street Electric Railway Employees will hold a convention in Oakland, Calif., beginning Sept. 10.

Wages Advanced.—An agreement has been signed between the management and employees of the Berkshire Street Railway, Pittsfield, Mass., to run until June 1, 1924, which provides for a 7.2 per cent increase in wages, retroactive to June 1. Working conditions are unchanged by the new agreement, which was reached without resort to arbitration. Following the announcement of the agreement, General Manager C. Q. Richmond said there would be no movement at present to increase fares as a result of the wage advance.

Views on Municipal Ownership Aired.—The Columbus Railway, Power & Light Company, Columbus, Ohio, is running quite a conspicuous advertisement in all three daily newspapers of Columbus, entitled "Municipal Ownership." The advertisement tells the history of the Municipal Railway of Seattle right up to a short time ago, when the fare after being reduced was raised again to 10 cents upon the vote of the City Council to return to the former rate. The ad says that municipal ownership leads to government usurpation of private rights; it develops, in the long run, inefficiency and waste; it increases burdens of the taxpayers, destroys individual initiative, incentive and enterprise, and tends toward socialism.

Election Called Off.—The election which was to take place in Goldsboro, N. C., on July 9 to determine whether the city should take over and operate the street cars was recently rescinded at a called meeting of the Board of Aldermen. The city of Goldsboro has not had car service for several years, and more than once it was announced that an election would be held to determine just what would be done with the railway property. It was announced early in the year that the city had about $35,000 which could be used for the rehabilitation of the property from the sale of the old power plant and that the money was being held as a sort of trust fund. Later it was announced that the amount of money to be used for rehabilitation purposes had been increased to $40,000.

Increase of Five Cents an Hour.—A new wage scale was negotiated by the Milwaukee Electric Railway & Light Company with its employees which became effective on June 1. This scale represents an increase of 5 cents an hour for all hourly employees in the transportation department and increases were also granted to the monthly employees. This is the second increase in 1923, the wages being advanced 5 cents an hour on Jan. 1. All men employed since May 1, 1921, received this increase the first of the year. With that increase considered the scale up to June 1, 1923, was for conductors in city operation 45 cents for the first year, 47 cents for the second year, 49 cents for the third year and 51 cents for the fourth year and thereafter. For the motormen the wages in cents per hour were 50 cents for the first year, 52 cents for the second year, 54 cents for the third year and 56 cents for the fourth year and thereafter. Negotiations are conducted semi-annually, thus permitting frequent adjustment of wages and working conditions to meet increases or decreases in the cost of living.

Financial and Corporate

Oakland Lines Sold

Way Cleared at Receivership Sale for Reorganization of San Francisco-Oakland Terminal Properties

J. F. Schuman of San Francisco on July 17 bid in the property of the San Francisco-Oakland Terminal Railways at foreclosure sale for the sum of $10,000,000. No other bids were made and the sale was closed over the objections of E. P. Troy, San Francisco, claiming to represent a minority of the stock and bond holders.

The sale of the property is the last step but one in the reorganization plan which has been under consideration since 1919, when the State Railroad Commission recommended that the transportation system be placed on a "sound financial basis" before any adjustment of fares could be considered by the commission.

The property was purchased in the names of Hugh Goodfellow, Warren Olney and W. I. Brobeck, as joint tenants and agents of the reorganization committee. The sale was ordered under a decree granted by Superior Judge James G. Quinn foreclosing a mortgage held by the Mercantile Trust Company and the Union Trust Company on various bond issues of the company. The judgment was for $20,000,000.

Final Steps Soon

The actual sale brought out a sharp conflict between Attorney Troy and J. B. Lanktree, commissioner named by the court to conduct the sale. Mr. Troy demanded that the lengthy decree of sale be read. This consumed fully half an hour. At the conclusion Mr. Lanktree called for bids and Attorney Schuman, on behalf of the joint tenants, bid $10,000,000. In payment of the bid Schuman offered three certified checks for the following amounts: $132,721.68, $132,721.67 and $132,721.27. He also added a list of stocks and bonds to make up the balance of the purchase price.

Following the sale, it was announced on behalf of the joint tenants that W. R. Alberger is named general manager and F. W. Frost, treasurer, to operate the properties, under the direction of the reorganization committee's agent. Mr. Alberger immediately issued an order appointing all former executive heads to the positions they had held. He also announced that all transportation forms bearing the name of the San Francisco-Oakland Terminal Railways would be honored pending the completion of the reorganization.

The final and last steps of the reorganization will be taken immediately when the new owners of the system will apply to the State Railroad Commission for approval of the details of the plans and the issuance of securities under the name of the Key System Transit Company. It is estimated that the first new issue will be for $10,000,000. Of this amount only such sum will be sold as will be needed to pay for one of the two new ferryboats recently purchased by the company, for such street paving as the company must do immediately, and such other expenses as cannot be cared for under the company's regular income.

Offer Made to Purchase Entire Common Stock

The West Penn Company, Pittsburgh, which some months ago bought a controlling interest in the Monongahela Valley Traction Company, Fairmount, W. Va., and changed the name to the West Penn-Monongahela Public Service Company, is now offering to buy all the common stock of the old company.

Under an agreement dated July 2, the company purchased from Senator C. W. Watson, on July 16, all his common stock in the West Penn-Monongahela Company. In accordance with his personal request the company now offers until Nov. 1, 1923, to all holders of common stock of the West Penn-Monongahela Company, the same opportunity to sell their stocks on identical terms and conditions.

Holders of record on July 16, 1923, of less than 100 shares will receive the full purchase price of $5 a share in cash. Holders of 100 or more shares of stock will receive $1.25 in cash for each share and certificates evidencing their right to receive the balance of the purchase in three equal annual payments on July 15, 1924, 1925 and 1926, with interest at the rate of 5 per cent per annum, payable semi-annually.

Dividend Tax Opinion Revised Again

Attorney-General Daugherty has rendered an opinion that "in cases where one corporation has received from another corporation distributions out of earnings or profits accumulated by such other corporations prior to March 1, 1913, or out of increase in value of its property accrued prior to March 1, 1913, the receiving corporation after having first distributed all of its earnings and profits accumulated since Feb. 28, 1913, may distribute to its stockholders exempt from tax, the amount so received by it from such other corporation."

Several months ago the Treasury Department issued a ruling to this effect and then rescinded it. It is said that the expression of opinion now made by the Attorney General will probably cause a restoration of the ruling.

Separation Planned

Staten Island Receivership to Be Lifted and Railway and Light Properties Separated

Plans were announced on July 21 for taking the Richmond Light & Railroad Company, Richmond, Staten Island, N. Y., out of the hands of the receiver. A letter sent to the stockholders and signed by J. H. Pardee, president of the company, said that the plans contemplate the division of the light company from the railroad company.

The directors have reached the conclusion that the most successful financing can be arranged by a separation of the lighting and railroad properties, each to be vested in a separate corporation, the lighting properties to be held by the principal corporation and the railroad properties by a subsidiary corporation. Moreover, under the present arrangement the company is subject to the overlapping jurisdiction of both the Public Service Commission and the Transit Commission. Accordingly, the Staten Island Edison Corporation has been organized to acquire the lighting properties.

The railway and ferry properties will remain in the possession of the Richmond Light & Railroad Company which will become a subsidiary of the Staten Island Edison Corporation. There is an alternate proposal by which the railway and the ferry property would be vested in a corporation already organized as the Richmond Railways, Inc., which also would be a subsidiary company of the Staten Island Edison Corporation.

Stockholders of the present Richmond Light & Railroad Company would get shares in the new Staten Island Edison Corporation on the basis of two shares of no par value for each share of the Richmond Light & Railroad Company stock. J. H. Pardee, president of the company, said:

> Preparation for the termination of the receivership are well under way, and it is hoped that an order of the Federal Court for the discharge of the receiver will be secured on or about Aug. 1. The termination of the receivership cannot, however, become permanently effective unless this company's indebtedness and receivership expenses are promptly paid. For this purpose bonds of the Staten Island Edison Corporation must be issued at once. Arrangements for the underwriting of the bonds have been practically completed.

Mr. Pardee announced also that a special meeting of the stockholders of the company would be held on July 31 to give the necessary statutory consent to the transfer of the lighting properties to the new company. Interests representing nearly 90 per cent of the stock have already signified their approval of the plan, President Pardee said. He further pointed out that the plan calls for no contribution from or assessment upon the stockholders, although they will retain their entire ownership in the property.

The Richmond Light & Railroad Company was formed in 1902 by a consolidation of the Staten Island Electric Railroad, the New York & Staten Island Electric Company and the Richmond County Power Company. It owns the

entire stock of the New Jersey & Staten Island Ferry Company, and a majority of the stock of the Southfield Beach Railroad.

Captain John J. Kuhn was appointed temporary receiver for the company on April 28, 1920. On Oct. 5, 1922, new interests acquired a majority of the capital stock of the company with the expressed intention of taking it out of the hands of the receiver.

The transfer of the lighting properties and exchange of stock were authorized on July 12 by the Public Service Commission. The order of the commission also authorized the issuance of bonds of Staten Island Edison Corporation to provide funds for the payment of existing indebtedness and receivership and readjustment expenses, such bonds to be secured by a modern mortgage with flexible provisions for future issues. The Transit Commission had previously authorized the transfer of the railway properties to Richmond Railways, Inc.

Approval Sought for Extension of St. Louis Bonds for Three Years

Special Master Henry Lamm of the Federal court for the Eastern District of Missouri has set July 27 as the date on which he will hear further arguments on the application of Receiver Rolla Wells of the United Railways, St. Louis, to have $14,800,000 of the railway's obligations which become due Oct. 1 next extended for three years.

Opposition to the granting of the extension has been registered by security holders of the road. Judge Lamm instructed T. E. Francis, attorney for Receiver Wells, to prepare an order reviewing the arguments for the extension.

The hearing held on July 13 developed that the termination of the road's receivership scheduled for next October has been indefinitely postponed pending final outcome of the valuation case now before the Missouri Public Service Commission. Mr. Francis indicated that the matter probably would go to the United States Supreme Court.

Sam O. Jeffries, counsel for bondholders of the Suburban Railway, has opposed extension of any securities other than those issued by the receiver. Advocating reorganization of the road Mr. Jeffries stated it was the duty of the court to take the railway out of the hands of the receiver and let its owners operate it. He favored a "hasty reorganization."

Col. Albert T. Perkins, manager for the receiver, testified that while net earnings in May reached "$31,000 plus," June was not so good. The hearing developed that the railway has a reserve fund of $7,031,000. Asked if this sum could not be diverted to meet the road's obligations in part, Colonel Perkins said that would be "unfortunate,'" as this fund is and should be maintained to pay off claims for accidents and to settle similar liabilities.

Operation Ceases in Henderson

Railway operation ceased on July 17 when the Henderson Traction Company, Henderson, Ky., was placed in receiver's hands following the filing of a petition by the Ohio Valley Banking & Trust Company, trustee for the bondholders. The receiver, Henry P. Barrett, a bondholder and member of the State Board of Charities and Corrections, was appointed by Circuit Judge N. B. Hunt. The petition asked that the city of Henderson be requested to answer and set up its claim against its co-defendant and asked for judgment of $148,800 from the company with accrued interest on the bonds. It also prayed that a receiver be appointed by the court to take charge of the property described in the mortgage. The traction company has defaulted on the annual interest on the bonds for five years. The city holds a prior lien of $5,000, due as a street oiling tax against the company.

City commissioners on July 19 applied for a court order for the removal of rails and tracks on Second Street from Ingram to Clark Street and Green Street from First to Clay Street so that the city could start its own street improvement program.

The $25,000 insurance on the rolling stock of the company has been transferred to Henry P. Barrett, receiver.

The loss of the car line in Henderson has been expected now for some time. The action of the Court of Appeals on the paving question undoubtedly hastened the end. It decided that the company must pay for paving between the rails. The city commissioners then passed an ordinance covering the streets on which cars are operated ordering pavement improvements. When asked immediately after the passing of the ordinance what they intended to do, the railway officials said there was only one thing to do and that was to take up the rails.

Messrs. Tumulty and Choate Receivers of Jersey Road

Federal Judge Lynch, in Newark, N. J., on July 24 signed an order placing the Morris County Traction Company in the hands of temporary receivers. Joseph P. Tumulty of Jersey City, former secretary to President Wilson, and Joseph K. Choate, New York, president of the company, were named receivers.

Application for the receivership was made by the People's Savings & Trust Company, Pittsburgh, trustee. Consent to the receivership was given by Mr. Choate. The action is the result of a proceeding in equity on a bill of foreclosure in which the People's Savings & Trust Company was the complainant and several electric concerns were defendants.

According to an affidavit filed by Otto S. Schultz, secretary and treasurer of the company, the company is in default $6,100 interest on bonds; $65,102 for past due franchise and local taxes; $38,108.26 for this year's taxes; $15,000 for a judgment obtained against the company, and $26,000 in current bills. The cash on hand of the company is said to be $2,500.

The main line of the company runs from Maplewood to Wharton via Springfield, Summit, Chatham, Morristown, Morris Plains and Dover. There is a branch connecting Elizabeth and Springfield and another running from Dover to Lake Hopatcong. There are about 60 miles of track in the system. Competition from jitneys has been unusually keen in the territory served by the company.

Charlottesville Road Reported Sold

Control of the Charlottesville & Albemarle Railway, Charlottesville, Va., is reported to have passed to the Virginia-Western Power Company through the purchase of all of the common stock of the railway by the power company. The Charlottesville & Albemarle Railway was incorporated in 1913 as a consolidation of the Redland Power Corporation and the Charlottesville & Albemarle Railway. It has perpetual light and power franchises in both city and county. The railway franchise in the county is perpetual, but that in the city expires in 1944. For some time past the company has been controlled by Norman James, John L. Livers and their associates.

The property is a comparatively small one, but under the present management it has been unusually successful as a money maker for an undertaking of its size. It has outstanding $122,700 of 7 per cent cumulative preferred stock and $500,000 of common stock. There is outstanding against the property only one issue of bonds dated April 1, 1915, and due April 1, 1943. The trustee under the terms of the indenture securing the bonds is the Equitable Trust Company, Baltimore. The authorized amount of the issue is $750,000, but of this sum only $437,000 is outstanding at the present time.

It is understood that Mr. Livers, who has been vice-president and general manager at Charlottesville, will remain with the company in that capacity.

Maryland Property Merged with Capital Traction

After more than a year's controversy over leasing trackage, an agreement has been reached whereby the Kensington (Md.) Railway will pass from its present ownership and become part of the Capital Traction Company, Washington, D. C. A settlement with the Kensington Railway, the Sandy Spring Railway and the Capital Traction Company several times seemed near but was held up each time by objections of one or the other interested companies.

The Kensington Railway consists of 3½ miles of track and extends from Kensington and Sandy Spring to

Chevy Chase, connecting with the system of the Capital Traction Company at the District line. It has been in existence for about twenty-eight years.

The Capital Traction Company may establish through car service this summer from Kensington, Md., to the downtown section of Washington.

The proposal is for the Capital Traction Company to lease the Kensington Railway for ten years under certain conditions set forth in a contract now awaiting the signatures of the parties concerned.

John H. Hanna, vice-president of the Capital Traction Company, stated recently that the agreement should be closed within a few days unless some unforseen difficulty arises.

The plan is to have the Maryland Public Service Commission fix a rate of fare that will cover operating expenses and provide whatever surplus the commission regards reasonable. Of such a surplus, if any, the Kensington security holders would get 75 per cent and the Capital Traction Company 25 per cent.

New Orleans Earnings Decline

The report of the third quarter of the trial year of the Public Service, Inc.,—April, May and June—just submitted by the company to Paul H. Maloney, Commissioner of Public Utilities at New Orleans, shows a material reduction in the per cent of income earned by the company on the rate basis of $53,348,000, as of March 31, 1923. There has been a decline of $116,703, in the net operating income for the quarter just lapsed as against that of the three months previous, a contingency which was not, however, unexpected by the city on account of the closing of the schools for the summer and the departure of many people from the city for the country and seashore.

The report shows that $3,000,000 has been added to the base rate since the commencement of operations on Oct. 1, 1922, and further that $394,405 of the earnings during the past three months has been added to the base rate.

There has been set aside for the sinking fund, dividends and surplus reserve during the past six months the sum of $322,711, equivalent to 6.99 per cent on the present rate base of $53,348,000, which is about $3,000,000 in excess of the $50,000,000 rate base fixed when the company started in on the trial year to earn 7.50 per cent.

It is not apprehended by Commissioner Maloney that the company will be unable to earn this per centum on the rate base which will finally be adopted at the conclusion of the trial year.

The gross earnings in the railway department were $747,928; in the electrical department $641,835, and in the gas department $474,960.

Line to Be Abandoned.—The Berkshire Street Railway will shortly abandon the line from Great Barrington, Mass., to Sheffield and Canaan, Conn., and the tracks, poles and wires will be removed.

Equipment Trust Certificates Authorized.—The Department of Public Utilities of Massachusetts has approved an issue by the Milford & Uxbridge Street Railway of $52,249 of 6 per cent equipment trust notes.

Seeks Increase in Budget for 1924.—In its budget for 1924, filed with the City Council, the Seattle Municipal Railway asks $6,747,173, an increase of $163,861 over 1923, the increase charged largely to miscellaneous labor and supplies.

Appeal in October.—The appeal of the Philadelphia Rapid Transit Company from the Public Service Commission's valuation and 7-cent, four-for-a-quarter ticket fare case will be argued in the October term of the Superior Court in Philadelphia.

Net Income Decreases. — The Eastern Massachusetts Street Railway, Boston, Mass., reports a net income of $474,123 for the first six months of 1923. The figure for the same period a year ago was $506,191. Expenses and taxes increased from $3,962,890 in 1922 to $4,377,324 for the period from January to June, 1923.

Bond & Share Company to Increase Capital.—A special meeting of the stockholders of the Electric Bond & Share Company, New York, N. Y., has been called for Aug. 3 to vote on increasing the capital stock from $40,000,000 to $50,000,000 by the issuance of 50,000 shares of preferred and 50,000 shares of common stock of $100 per value of each.

Auction Sales in New York.—At the public auction rooms in New York on July 25 there were sold $3,000 of United Traction Company (Albany) 4½ per cent bonds, due 2004, coupons June and December, 46½ per cent; $25,000 Broadway & Seventh Avenue Railroad first consolidated mortgage 5 per cent gold bonds, due December, 1943, 62½ per cent.

Earnings and Passengers Increase.—The net earnings of the Boston Elevated Railway for the six months ended June, 1923, were $1,062,134, against $1,045,534 for the same period a year ago. There was an increase in the total passengers carried, 177,955,358 being the number for the first six months of 1922 and 195,051,019 for the same period of the current year.

Earnings Increase Under Restored Fare.—A gain in earnings of the Seattle Municipal Railway is shown in a check of receipts for the first fifteen days under the restored 8½-cent fare, as compared with a similar period last year. There were fewer passengers, but receipts were $257,274, an increase of $1,506. The discrepancy was due to a smaller number of school fares during the period this year.

Income and Passengers Increased.—For the six months ended June 30, 1923, the Philadelphia Rapid Transit Company realized a net income of $1,335,881. For the same period ended June 30, 1922, the sum was $1,299.707. There were 459,437,387 passengers carried from January to June, 1923, against 420,345,082 passengers carried for the same six months a year ago. The passengers revenue increased from $20,681,618 in 1922 to $22,150,187 for the first six months of 1923.

Conspectus of Indexes for July, 1923

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares* 1913 = 4.84	July 1923 **6.92**	June 1923 **6.92**	July 1922 **7.04**	May 1921 **7.24**	May 1923 **6.88**
Street Railway Materials* 1913 = 100	June 1923 **171**	May 1923 **173**	June 1922 **172**	Sept. 1920 **247**	Sept. 1921 **156**
Street Railway Wages* 1913 = 100	July 1923 **212**	June 1923 **210**	July 1922 **210**	Sept. 1920 **232**	Apr 1923 **207**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	June 30 1923 **6.39**	May 31 1923 **6.98**	June 30 1922 **5.64**	July 31 1920 **11.12**	Feb. 28 1922 **4.14**
U.S. Bank Clearings Outside N. Y. City (Billions)	June 1923 **15.38**	May 1923 **15.58**	June 1922 **13.47**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	June 1923 **1,378**	May 1923 **1,467**	June 1922 **1,660**	Jan. 1922 **2,722**	May 1923 **1,467**
Business Failures Liabilities (millions)	**52.00**	**31.77**	**39.59**	**105.7**	**31.77**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	July 1923 **222.1**	June 1923 **220.7**	July 1922 **169.7**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	June 1923 **153**	May 1923 **156**	June 1922 **150**	May 1920 **247**	Jan. 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	July 1 1923 **13.09**	June 1 1923 **13.38**	July 1 1922 **12.11**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's — Wholesale Commodities 1913 = 120.9	July 1 1923 **188.7**	June 1 1923 **191.4**	July 1 1922 **173.7**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	June 1923 **144**	May 1923 **143**	June 1922 **141**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	June 1923 **160.1**	May 1923 **160.3**	June 1922 **155.4**	July 1920 **204.5**	Aug 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population.

Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials.

Wages index is relative average maximum hourly wage of motormen and conductors on 105 street and interurban railways in the United States, operating more than 100 passenger cars each, and weighted according to number of cars.

Applies for Note Issue.—The Wisconsin Gas & Electric Company, Kenosha, controlled by the Wisconsin Edison Company, Inc., has applied to the Railroad Commission for authority to issue $400,000 of serial notes to pay in part the purchase price of the electric and gas plants of the Waukesha Gas & Electric Company.

Service Suspended.—The South Carolina Gas & Electric Company, Spartanburg, S. C., suspended practically all railway service at midnight on July 21. In announcing compliance with the order of the commission the company issued a statement explaining the operation of cars on the Glendale-Clifton line, the Saxon line and the operation of buses to make connections at East Spartanburg.

Stock Decreased.—Stockholders of the Montgomery Light & Traction Company have filed in the Probate Court a certificate decreasing the capital stock from $2,000,000 to $2,000 and the number of shares from 20,000 to 2,000. The resolution effecting these changes was adopted at a recent meeting in Montgomery. Early in the present year the company was taken over by the Alabama Power Company.

Grand Rapids Ran Slightly Behind in June.—The Grand Rapids Railway, Grand Rapids, Mich., failed by $3,451 to meet its expenses and make an 8 per cent return on its investment during June, according to its monthly report. This places the accumulated deficit in the equalization account at $16,301. Whenever the equalization account is short $50,000, or ahead $50,000, the fare will automatically increase or decrease.

Subsidiaries Merge.—The York County Power & Light Company and the Westbrook Electric Company have been consolidated with the Cumberland County Power & Light Company, Portland, Me., operating the Portland Railroad. The Cumberland property has for some time owned a majority of the stock on both the above-mentioned companies, although it has operated them under their own names. The merger has been approved by the Public Utilities Commission and became effective on July 1.

Applies to Issue Bonds.—Application to the Public Service Commission for permission to sell $6,000,000 of first lien and refunding mortgage gold bonds, 6 per cent series, was made recently by the Alabama Power Company. The bonds would be due in 1951. The company also applied for permission to issue $6,500,000 in first mortgage, 30-year 5 per cent gold bonds to be deposited with the United States Mortgage & Trust Company, under a mortgage and deed of trust dated June 1, 1921.

Tube Company to Pay Initial Common Dividend.—An initial semi-annual dividend of 2½ per cent has been declared on the non-cumulative preferred stock of the Hudson & Manhattan Railroad, payable on Aug. 15 to holders of record of Aug. 1. The directors have also declared the regular semi-annual 2½ per cent interest on the 5 per cent adjustment income bonds, payable on Oct. 1. The company operates between New York and New Jersey under the Hudson River and to Newark. Traffic has grown tremendously in recent months.

Wants Service Suspended. — The Pennsylvania Public Service Commission has been requested by the Mayor of Titusville, Pa., to order immediately the suspension of service by the Titusville Traction Company until the company properly bonds its rails. This action was taken after Mayor Archer had been shown by Fred Larson, city electrician, a section of pipe taken from lines within the water plant in the west end.

Five-Cent Fare Not Possible.—General Manager Dana of the Boston Elevated Railway recently issued a statement to the effect that a universal 5-cent fare was not possible until the entire deficit of the company was paid off. Further, that it was the intention of the company to turn over about $1,100,000 to twelve greater Boston cities and towns in liquidation of advances made by them to the company. This will be the second payment on the Elevated deficit of 1919 which originally amounted to $3,980,000. It will leave a balance of $2,362,000 to be paid back to the municipalities, as more than $500,000 was "paid on account" by the Elevated last year.

Arguments Heard on Valuation.—The Missouri Public Service Commission on July 19 heard arguments on motions filed by the United Railways, St. Louis, and the city of St. Louis for a rehearing of the railways valuation case. Thomas E. Francis, attorney for Receiver Rolla Wells, pleaded for a reopening of the case on the grounds that the valuation should have been fixed at $69,100,000 instead of $51,781,348, while Former City Counselor Henry S. Caulfield, on behalf of the city, contended the valuation should not have exceeded $30,414,241. He said that the company should have deducted more for depreciation and should not have allowed $2,700,000 in promotion costs. The commission has taken the matter under advisement.

Authorizes Point Gratiot Abandonment.—Commissioner Pooley of the Public Service Commission has granted the petition of the receiver for the Buffalo & Lake Erie Traction Company, operating an interurban line between Buffalo, N. Y., and Erie, Pa., for permission to abandon the so-called Point Gratiot line and portions of the local lines in the city of Dunkirk. The lines to be abandoned were operated by the receiver of the Buffalo & Lake Erie as part of the system of the Dunkirk Street Railway. The commission's decision permits the abandonment of all the franchises for tracks in the city of Dunkirk except those used by the interurban lines. The company has contended that the Dunkirk local lines and the so-called Point Gratiot line were not profitable and should be abandoned.

More Tokens Sold.—Since the Public Service Railway, Newark, N. J., was authorized by an injunction obtained in the Federal court to charge an 8-cent fare, the corporation has carried a total of 679,549,922 passengers, or a monthly average of 33,977,496. The number paying the base fare of 8 cents cash was 246,635,339, or a monthly average of 12,331,766. The remaining passengers, exclusive of school children, paid fares by tokens bought at the rate of four for 30 cents. The railway recently filed its twentieth monthly statement in the Federal court at Trenton showing a total of 35,317,061 passengers carried in June. Of this number 11,515,609 paid 8-cent fares. A compilation of all the statements indicates that at the close of June 803,030 more tokens had been sold than had been turned back.

Line to Be Reorganized.—The two one-man cars that the city of St. Louis purchased several years ago to operate over the St. Louis Municipal Bridge between St. Louis and East St. Louis, Ill., probably will roll over the tracks of the rehabilitated St. Louis & Jennings Railway. Plans are under way for a complete reorganization of this line, which recently suspended operations because of losses suffered in competition with jitneys. J. A. Jeorg, chairman of a committee of citizens appointed to work out plans for reopening the car line, has prepared plans for community operation of the line. A total of $75,000 would be raised to refit the line. Of that sum, $35,000 would be paid the present owner, Wayne J. Staedlin, who bought the line at a bankruptcy sale last March. The balance would be used as follows: $5,000 for grading, $11,000 for rails, $3,000 for ties, $2,000 for car repairs and $5,000 for labor. A further expenditure of $14,000 will be necessary to refit the Helen Avenue branch line.

Surface Lines Bondholders Would Foreclose.—The Equitable Life Assurance Society, New York, as holder of an issue of $1,500,000 of consolidated mortgage 4 per cent gold bonds of the Coney Island & Brooklyn Railroad, has asked the court to permit an action to foreclose the mortgage, the bond interest having been in default. The reorganization committee of the Brooklyn Rapid Transit Company made a tender of the interest on the bonds, and the company asked the court for permission to "accelerate" the principal, have it adjudged due and payable, and to bring a foreclosure action. The railroad and the receiver argued that the property was in the hands of the court and that the trustee under the mortgage had no right to accelerate the principal, in view of the receivership and of the tender of all the back interest. The accumulated interest due up to July 1 amounted to $270,000. The matter is now before the court. The Coney Island & Brooklyn's principal lines are the Franklin Avenue, Smith Street and De Kalb Avenue.

Traffic and Transportation

Ohio Buses Under Commission

Electric Railway Operatives Attend Conference at Columbus and Discuss Operating Rules

The so-called Freeman-Collister bus bill relating to the operation of buses in Ohio went into effect on July 27. As a result all intercity and local bus lines and all commercial trucking companies doing intercity hauling are compelled to secure certificates of convenience and necessity from the Utilities Commission and post bonds. There is an insurance clause in the new law. The license fees range from $40 to $240, graduated according to the capacity of the buses.

Under the new law bus lines and trucking companies which were doing business in the state prior to April 28, the date the bill was filed with the Secretary of State, were issued certificates of convenience without hearings, except where there were protests filed with the commission. Lines which were established after that date were compelled to file applications for such certificates.

In anticipation of the application of the new law, traction, steam railway, motor bus, commercial trucking and street railway men were invited to meet with members of the Public Utility Commission at Columbus on July 11 and 12, when the proposed regulations which are to be imposed by the commission under the new bill were discussed. The commission reserved to itself the right finally to approve a set of regulations after the Freeman-Collister bill is in effect, but the principal regulations to be imposed were decided upon at the meeting.

The decisions so far reached are all tentative, but copies of the regulations as finally adopted by the commission will be attached to each certificate of convenience to be issued by the commission to the motor bus and commercial trucking lines which operate under the provisions of the new law.

Eighty Rules Will Govern Operation

About eighty rules in all, mostly of a minor regulatory nature, will govern the operation of the bus lines and truck companies. Principal among the regulations were safety measures, which were discussed at great length. The proper manner to approach and cross a railroad or interurban traction crossing was considered from all angles. It was agreed that passenger-carrying buses should come to a full stop before crossing a railroad right-of-way either inside the city or in the country. The matter of stopping at interurban traction crossings was left to the discretion of the commission, with the suggestion that the commission specify all such stops on the route to be traversed by the buses. It was also agreed that buses should pass crossings in second speed.

One rule of operation that will be written by the commission into its final regulations is that bus lines shall adhere faithfully to their schedules. Regular schedule trips will all have to be made on time, except for circumstances over which the operator has no control. Another rule upon which the commission will insist is that when a bus breaks down on the road it shall transfer its passengers to the next bus going in the same direction, whether that bus be operated by the same company or is run by a competing company.

Among the representatives of the electric railways who attended the meeting was John S. Bleecker, general manager of the Indiana, Columbus & Eastern Traction Company and head of the Dayton & Columbus Bus Transportation Company and the Columbus & Zanesville Bus Transportation Company, with offices at Springfield. According to Mr. Bleecker, the regulations so far agreed upon are for the most part practical ones which will be easy of enforcement.

Railway Agrees to Four Beeler Recommendations

Four items in the Beeler report, looking to changes in the railway system of New Orleans, which have been approved by resolution by the Commission Council, have been agreed to by A. B. Patterson, superintendent of the New Orleans Public Service, Inc. The changes will be carried out at once by the company without further parley. They are:

Rerouting of the Tchoupitoulas Street line across Canal Street to Esplanade Avenue and thence to Rampart Street.

Standardization on wide gage tracks throughout the city.

Extension of the Broadway line to Fig Street.

Preparation for the St. Claude Street line extension.

Several other matters in the Beeler report, some of which may require the granting of new permits and the cancellation of others, by ordinances of the Commission Council, are still under consideration by both counsel for the Public Service, Inc., and the City Attorney.

It is generally believed that the matters under discussion will be adjusted at an early date as some very important municipal work is being delayed until the questions in connection with the rerouting of the railway have been solved definitely.

Two-Mile Bus Line Operated by Pennsylvania Railway

The Beaver Valley Traction Company, New Brighton, Pa., of which W. H. Boyce is general manager, is now operating a bus line between Beaver and Vanport, Pa., a distance of a little more than 2 miles. The establishment of this service was brought about by the reconstruction of approximately 6,500 ft. of the local line of the Beaver Valley Traction Company. At the Vanport terminal of the line the road connects with the Steubenville, East Liverpool & Beaver Valley Traction Company, which operates through service from Steubenville and East Liverpool over the local line to Beaver. Local traffic in Vanport did not warrant going to any great expense to maintain service, but it was necessary to do so on account of the through traffic of the Steubenville, East Liverpool & Beaver Valley Traction Company.

In consequence the railway purchased two twenty-four-passenger Reo buses with McKay bodies at a cost of approximately 50 per cent of the amount necessary for a temporary track. Not only did this call for a smaller investment, but upon completion of the reconstruction the buses will be available for other uses.

No attempt has been made to compare revenue and operating expenses, inasmuch as the bus line is not replacing a street car line, but is being used to maintain a service from which the railway has a definite amount of revenue, namely, that received as its portion of the interurban traffic. In other words, the bus operation is purely an expense necessary to maintain the interurban traffic, but is an amount that would be less than would be occasioned if the railway company had resorted to the construction of temporary street car tracks.

Petitions for Municipal Bus System in Schenectady

The city of Schenectady, through Mayor Whitmyre and Common Council President Shay, on July 25 urged Governor Smith to convene the Legislature of New York State in extraordinary session for the purpose of authorizing the city of Schenectady to start a municipal transportation system to compete with the Schenectady Railway, whose cars are now running on all lines but are not patronized on account of the trolley strike. Schenectady's clamor for buses was added to that of Buffalo and New York when a resolution adopted by the Common Council of the electric city was presented to the Governor.

The Schenectady Council in its resolution alleges that the strike, bad service last winter and the fact that the railway is operating at a great loss, which "may prevent it from making needed extensions" to its lines, are sufficient reasons for it to be authorized to resort to the use of city-owned buses for transportation.

Jitneys in Birmingham Seek Relief

Petitions asking for an initiative election on the jitney question have been filed by the Jitney Owners & Operators' Association with the clerk of the City Commission of Birmingham, Ala.

City officials say an election will be called in the event all the requirements of the law have been met in the petitions. The first step to be taken by the City Commissioners is the verification of the names signed to the petition. An election must, however, be called or refused within thirty days from the date of filing the petition.

Meanwhile the temporary injunction restraining the city from putting the jitneys off the streets has been dissolved. E. D. McLendon, president of the City Commission, announced at once that the city would carry out its agreement with the railway commencing on July 22, the date the dissolution of the injunctions became effective.

In dissolving the injunction Judge Walker held as follows:

That the ordinance is within the city's police power.

That the petitioners have no inherent right to operate motor vehicles as common carriers over the streets.

That the motive of the commission in enacting the law cannot be questioned.

The initiative proceeding is an attempt on the part of the jitney operators to secure relief from the terms of a settlement made recently between the city and the Birmingham Railway, Light & Power Company which the operators of the autos consider unduly detrimental to their interests. Briefly the jitney ordinance recently enacted provides that jitneys cannot be operated on down-town streets within four squares of a railway line; that the jitneys must pay a city license of $100 a year, and that owners must take out an indenmity bond of $10,000. The terms of the city's agreement with the railway provide that fares be reduced from 8 cents to 7 cents cash with a ticket fare of 6¾ cents.

Agreement on Fare Extension

The Dallas Railway recently reached a fare agreement with the city whereby the 6-cent fare will be continued. The conditions under which the extension would be granted were reviewed in the ELECTRIC RAILWAY JOURNAL, issue of June 30.

Bus Restraining Order in Schenectady Will Be Argued

The right of a county judge to set aside an injunction order of the Supreme Court will be argued on July 28 before Supreme Court Justice Henry W. Borst at Amsterdam. The question grows out of the action of County Judge John J. McMullen of Schenectady in vacating the restraining order issued by Justice Edward M. Angell enjoining jitney operators from running automobiles in competition with cars of the Schenectady Railway.

Judge William M. Nicoll, who represented the jitney men and obtained the vacating order from Judge McMullen, has been served with an order to show cause before Judge Borst why the vacating order should not be set aside.

One paragraph states that "by reason of said unauthorized order of the county court of Schenectady, the plaintiff has sustained and will sustain great and irreparable damage and injury to his business."

The Emergency Taxicab Operators' Association announces that there are now 537 operating buses in Schenectady and along the interurban route of the Schenectady Railway. This number includes almost all of the jitney operators who are on regularly assigned routes.

Weekly Pass to Be Continued in Tacoma

At the conclusion of one year of using weekly passes on the Tacoma Railway & Power Company's lines, the company announces its intention of continuing the use of the pass indefinitely. The average fare for folks who used the pass during the year is 4.89 cents. The first week the passes were used 7,007 were sold. Since that time there has been a gradual increase, until the final week in the year showed 12,125 sold.

The average number of passes a week is 11,054; the average pass-rider uses his ticket for street car transportation 3.81 times a day, or 26.65 times a week, the figures show. For the year, a total of 574,805 passes and 15,282,232 rides on passes is stated. The highest number of rides per pass was registered the week of Aug. 21-27 last year. The average pass holder rode 28.20 times that week, at a cost of 4.62 cents a ride. The lowest normal week was Dec. 25-31, when the pass holders averaged 24.65 per pass.

All Night Service Ends. — All-night service, which has been maintained in New Castle, Pa., for many years by the Pennsylvania-Ohio Electric Company, has been discontinued.

Joker Bill Appears Again.—Under the terms of a bill introduced in the Senate of Georgia passengers riding on street cars, interurban cars or on railroad trains who are unable to secure a seat will be transported at one-half the regular rate of fare.

Two Cents a Mile to Continue.—Basing its decision on tentative appraisals and valuations fixed by the Commission for the Detroit United Railway and its system, the Public Utilities Commission recently directed a continuance of the 2-cents-a-mile rate of fare. The minimum fare will be 5 cents.

Will Decide Fare.—A hearing will be held on Aug. 1 before the California Railroad Commission to determine the rate of fare to be charged by the Fresno Traction Company. The company is now operating on a 6-cent fare and the commission will decide whether the company must return to the old rate of 5 cents or continue at the higher rate.

Wants Fare Lowered.—Mayor Frederick W. Donnelly of Trenton, N. J., expects to introduce a resolution before the City Commission authorizing the City Counsel to take up with the Public Utilities Commission the matter of asking the Trenton & Mercer County Traction Corporation to reduce its fare from 8 to 7 cents and eliminate the 1 cent charged for transfers.

Six Cents in Minneapolis.—Hearings on the Minneapolis Street Railway fare issue were to be resumed the end of this month. Early in June the State Railroad & Warehouse Commission adjourned hearings, which meant the continuation of the 6-cent fare for another few months. The hearings were deferred in order to permit the valuation experts for the city and the company to return to Denver, where a similar hearing was taking place.

Authorizes Continuation of Eight-Cent Fare.—The Public Service Commission of New York on July 19 authorized the Fonda, Johnstown & Gloversville Railroad to continue the 8-cent fare in Amsterdam for an indefinite period. The city sought to have a 5-cent fare re-established in June, when a prior fare restriction waiver expired. The company, in its testimony before the commission, showed that for the four years and four months, 1919 to 1923 (four months) inclusive, a deficit occurring in each year except in 1922 in the operation of the lines in Amsterdam.

May Reroute Entire System.—An announcement has been made by the Tri-City Railway of its plan to reroute the entire railway system in Davenport. The officials of the company are to appear before the Davenport City Council and ask permission to begin the undertaking. If the plan meets with the approval of the city officials the company will start immediately to reroute practically every line in the city. Officials of the railway company claim that if the new plan is approved it will mean a reduction in the cost of operation for the company and the improvement of service. It is expected that the city officials will approve the plan. The cost to the company of carrying it out is estimated at $400,000.

The 100-Mile Strip Plan Extended.—Owing to the success of the 100-mile strips sold since June 1 at $1.25 on the 16-mile Clinton line of the Terre Haute, Indianapolis & Eastern Traction Company, E. M. Walker, general manager of the Terre Haute division, has extended the plan to the three other lines of the division effective July 11 within Indiana and Aug. 10 between Indiana and Illinois points. The company had already made use of low rate round-trip tickets good for ten days as an effective answer to jitney competition. However, these did not take care of people who had to board the vehicles at crossroads. The mileage strip on the Clinton line promptly produced a 2¾ per cent increase in revenue without any particular change in the industrial conditions of the territory.

Personal Items

B. C. Adams Installed

New Executive at Toledo Has Assumed Duties of President and General Manager There

Benjamin Cullen Adams has assumed his duties as president and general manager of the Community Traction Company, Toledo, and also as vice-president and general manager of the Toledo Edison Company, succeeding Frank R. Coates in both places and as active executive of the Doherty interests in Toledo.

Mr. Coates spends practically all of his time at the New York offices of Henry L. Doherty & Company, having been called there to assume important duties soon after the death of Frank Frueauff, partner of Henry L. Doherty. Mr. Coates still retains the presidency of the Toledo Edison Company and is a director of the Community Traction Company.

B. C. Adams

The new traction executive at Toledo is one of the original Doherty cadets, having entered the employ of the Madison Gas & Electric Company, Madison, Wis., as soon as he was graduated from the University of Wisconsin in 1903. He was born at Madison in 1880. While he is one of the youngest men in the executive ranks of the Doherty operating organization he is one of the oldest in point of service. His preliminary schooling was secured in the public schools of his home city.

Mr. Adams was sent to Lincoln, Neb., as general superintendent of the Lincoln Gas & Electric Light Company, after he had familiarized himself with everything about the Madison company. At that time the plant in Lincoln was obsolete and unable to take care of the requirements. Mr. Adams was instrumental in getting the plant back on a paying basis and was made manager in 1909. In the summer of 1913 he was ordered to Spokane, Wash., to take charge of the Spokane Gas & Fuel Company, where he remained for nine months.

Next Mr. Adams was sent to São Paulo, Brazil, to make extensive investigations and reports on a big utility property there for Ellis & Company, bankers of London, and remained there most of the time until the fall of 1914, when war broke out and he was recalled to the United States. The boat on which Mr. Adams and his family were scheduled to sail was *spurlos versenkt* and no word was heard from them for weeks. Finally they landed at New York on Christmas Day and explained that at São Paulo they had missed the boat that was sunk and had sailed by the next steamer.

His next connection was with the Montgomery Light & Water Power Company, Montgomery, Ala., where he remained for a year and a half until transferred to the management of the Empire District Electric Company, at Joplin. In January, 1920, he was shifted to St. Joseph as successor to James H. Van Brunt in management of the St. Joseph Railway, Light, Heat & Power Company.

Mr. Adams went to Toledo on June 19, this year, from St. Joseph and soon thereafter was formally elected to his present executive capacity in the Doherty properties there.

Mr. Adams has associated with him in the traction management J. Franklin Johnson, as vice-president and general superintendent of the Community Traction Company, and in the power and lighting business Ferd J. Derge, as vice-president and assistant general manager of the Toledo Edison Company.

J. L. Gould, who has been master mechanic for the Wilmington & Philadelphia Traction Company and the Southern Pennsylvania Traction Company, has tendered his resignation and will on Aug. 1 become associated with the street railway sales department of the Texas Oil Company. Mr. Gould received his first electrical training several years ago in the Schenectady N. Y., and Lynn, Mass., shops of the General Electric Company and later was transferred to the Philadelphia office of the same company. He afterward was appointed master mechanic for the Reading Transit & Light Company, which position he held for several years, leaving Reading to become master mechanic in Wilmington, Del., and Chester, Pa. Mr. Gould has taken an active interest in the work of the American Electric Railway Association. He is a past-president of the Keystone Railway Club and at the present time is serving on the equipment committee of the American Electric Railway Engineering Association.

George Kidd President

Excellent Record of British Columbia Official Recognized by Board of Directors

George Kidd, general manager of the British Columbia Electric Railway, Vancouver, has been elected president of the company by the board of directors at a recent meeting in London, England; W. G. Murrin, assistant general manager, has been made vice-president, and A. T. Goward, manager of the Vancouver Island system, has been made vice-president at Victoria.

These changes are the result of the recommendations of Sir Ernest M. Harvey, who made a recent visit to the company's properties in British Columbia, so that the titles of the executive officers would more clearly define their powers and responsibilities. No change in duties will take place, Mr. Kidd remains in charge of the company's entire policies and holds power of attorney from the board of directors in London and Mr. Murrin remains in charge of the actual operations on the mainland of British Columbia and Mr. Goward in charge of operations on Vancouver Island.

George Kidd

George Kidd, the new president of the company, has long been associated with the British Columbia Electric Railway, having been both in the offices in London and in British Columbia. He was appointed secretary to the company in connection with its London work in January, 1908. Later he was made comptroller and removed to Vancouver. This position he held until 1914, when he was appointed general manager to succeed R. H. Sperling. One of his fairly recent accomplishments was the acquisition of the Western Power Company of Canada, which system has been amalgamated with the mainland system of the British Columbia Electric Railway.

Mr. Kidd was at one time honorary vice-president of the Canadian Electric Railway Association. He is a member of the National Electric Light Association, the American Electric Railway Association and the Canadian Electrical Association.

Frank R. Phillips Acting Manager at Pittsburgh

Frank R Phillips, superintendent of equipment of the Pittsburgh Railways since 1910, has been appointed acting general manager for the receivers of the company, succeeding the late P. N. Jones. Mr. Phillips has long been connected with electric railway work, but heretofore his activities have been confined very largely along engineering lines.

Previous to 1910 he was master mechanic of the Cleveland City Railway. He entered the service of that company in 1894 after leaving high school. He advanced gradually with this company until he became a foreman and then master mechanic of the company. In 1903 on the consolidation of the local lines in Cleveland he became connected with the Cincinnati, Newport & Covington Railway.

Later he served with the Michigan United Railway and the Ohio Brass Company. In July, 1908, he returned to Cleveland as master mechanic.

New General Superintendent at Zanesville

John William Hewitt has been appointed general superintendent of the Columbus, Newark & Zanesville Traction Company, with headquarters in Zanesville, Ohio. He is a railway man of many years experience. A native of Nottingham, England, he moved to Australia when a youth and began his career as a motorman on the New South Wales government tramways at Sidney. On the outbreak of the Boer War he enlisted in the New South Wales bushmen and was in the thick of the campaign in South Africa. At the conclusion of hostilities he came to the United States, where he secured employment with the Seattle Electric Company. He remained with this company from 1902 to 1908, rising to the position of superintendent of employment.

In 1908 Mr. Hewitt was called to the Portland Railway, Light & Power Company at Portland, Ore., as superintendent of interurban lines, retaining this post until 1914, when he went to the Sumpter Valley Railroad, a steam road in southern Oregon, as superintendent. He remained in the capacity just mentioned until 1916, when he went east to Reading, Pa., as superintendent of railways with the Reading Transit & Light Company. After a year's service with the Reading company he returned to the Sumpter Valley line as general manager, continuing in that capacity until he became connected with the Columbus, Newark & Zanesville as general superintendent.

The post which Mr. Hewitt will fill in Ohio was formerly combined with the general superintendency of the Indiana, Columbus & Eastern Traction Company, held by C. C. Fast, but the increasing duties made it necessary to separate the two offices, Mr. Fast continuing with the Indiana, Columbus & Eastern. In addition to the interurban lines between the cities named, the Columbus, Newark & Zanesville properties also include the city systems in Newark and Zanesville and the light and power business in the latter system.

J. T. Hambleton General Manager at Warehouse Point

J. T. Hambleton, who has been appointed general manager of the Hartford & Springfield Street Railway, with offices at Warehouse Point, Conn., was born in Quakertown, Bucks County, Pa., on Oct. 25, 1874. He was educated in the public schools of that town. He began his electric railway experience in Allentown, Pa., in 1894, and has been in that work almost continuously since that time, being for some years with the Lehigh Valley Transit Company's lines in various capacities. After several years of track and shop work he became in 1900 superintendent of construction for the Bethlehem Construction Company, having charge of the work on the Dayton, Springfield & Urbana and other routes. At this time he built the Slate Belt Transit Company line, of which he later became the controlling owner. This road was first run by the Lehigh Valley system, but became an independent road in 1911. From 1911 to 1916 Mr. Hambleton was general manager of the Wilmington Southern Traction Company. Gaining control of the Slate Belt Transit Company in 1916, he was made president and general manager, with headquarters at Pen Argyl. This office and interest he still retains.

H. W. Plummer resigned recently as general manager of the Asheville Power & Light Company, Asheville, N. C. He has gone to Europe for a three months trip to study general business conditions. Mr. Plummer remains a member of the board of directors for the Asheville company.

George D. Yeomans was appointed counsel of the Brooklyn-Manhattan Transit Corporation at a meeting of the board of directors on July 16. He succeeds Carl M. Owen, counsel during Lindley M. Garrison's receivership of the Brooklyn Rapid Transit Company, with which Mr. Yeomans was long connected as counsel.

Eugene Betts has been promoted to assistant consulting engineer of the Southern Pacific Company, at New York. He has been assistant engineer with the company for several years since the war, during which he was a major in the construction division of the army. Mr. Betts was formerly with J. G. White & Company, Ltd., as director and general manager of railway and power properties in Central and South America.

J. J. Vaughan has been appointed master mechanic of the Memphis Street Railway. Since 1905 he has been associated with this property, entering the mechanical department on May 4 of that year. Since then he has served in every branch of this department and was general foreman for several years. In 1900, after serving for three years in the Louisville & Nashville shops at Decatur, Ala., he became connected with the mechanical department of the Birmingham Street Railway.

S. E. Mason of San Antonio has joined the staff of the San Diego Electric Railway as superintendent of equipment. He will have charge of all equipment, way and structures and of the bonding and welding departments. Mr. Mason is a graduate of the University of Texas and has had considerable experience in that state as an electric railway man. For the past six years he has been with the San Antonio Public Service Company and had charge of the reconstruction lines in San Antonio.

C. S. Walters has succeeded Harry W. Plummer as vice-president and general manager of the Asheville Power & Light Company. Since 1913 he has been district manager of the Pacific Power & Light Company's gas and electric properties in the Walla Walla Valley. Prior to that he had been general manager of the Walla Walla Valley Railway and was later elected vice-president. Before going to Walla Walla Mr. Walters was general agent for the Oregon Electric Railway with headquarters at Salem, Ore. Mr. Walters' early connections were with steam railway operation.

Obituary

J. A. McCampbell

John A. McCampbell, for the last eighteen years a valued member of the Stone & Webster organization, died recently. Mr. McCampbell's varied experience in building and operating public utilities soon created a wide demand for his services as an efficency engineer, and he instituted betterment operation in power plants at Houston, Dallas, El Paso, Fort Worth, Key West, Jacksonville, Seattle and Bellingham. When Stone & Webster were called upon by the Buffalo General Electric Company to build a large steam plant on the Niagara River, Mr. McCampbell was brought from Dallas to supervise the installation of mechanical equipment. From Buffalo he went to Philadelphia as general superintendent on the construction of a 100,000-kw. plant for the Philadelphia Electric Company.

Mr. McCampbell entered the employ of Pepper & Register, engineers and electric railway contractors at Philadelphia, in 1892 and remained with them until 1898, when he was employed by the South Shore & Boston Street Railway and later by the Massachusetts Electric Company as chief engineer of power stations at East Braintree and Quincy Point. In 1901 and 1902 he was chief engineer of power stations for the Houghton County Street Railway at Hancock, Mich., and was connected with several other utilities up to the time he entered the employ of Stone & Webster on Dec. 1, 1906. He was born in Knoxville, Tenn., in 1873.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

G. E. Completing Heavy Electrification Work

Important heavy electrification work for seven railroads is nearing completion in the Erie works of the General Electric Company.

Three 120,000-lb. 600-volt freight locomotives are being prepared for shipment to the Bethlehem Chile Iron Mines. A special feature of these locomotives are four offset trolley poles, two on each side of the locomotive, for collection from trolley wires along the side of the track, used for maneuvering on docks close to the water edge. These units will also be equipped with two 600-ft. cable reels for use on sidings or spurs and where no overhead trolley is available. They are of the steeple-cab swivel-truck type, length 37 ft. 4 in., height 11 ft. 11 in. They will also be equipped for dumping cars with compressed air.

Two 120,000-lb. 600/1,500-volt freight locomotives for the Sacramento Northern Railway are now in assembly. These resemble the locomotives intended for the Bethlehem Chile order described above with the exception of the offset trolley poles and cable reels.

The largest order in process of manufacture includes ten 150-ton 3,000-volt locomotives for the Mexican Railway, Ltd. It is expected that the first of these will be ready for test about Aug. 15.

High-speed tests of the locomotive ordered by the Paris Orleans Railroad are expected to be held next month. This locomotive, now nearly completed, will be a 120-ton machine of special construction operating at 1,500 volts with gearless motors and equipped with two three-axle driving trucks, a two-axle guiding truck at each end and two box cabs. It is 62 ft. long. Speeds in excess of 90 m.p.h. are expected.

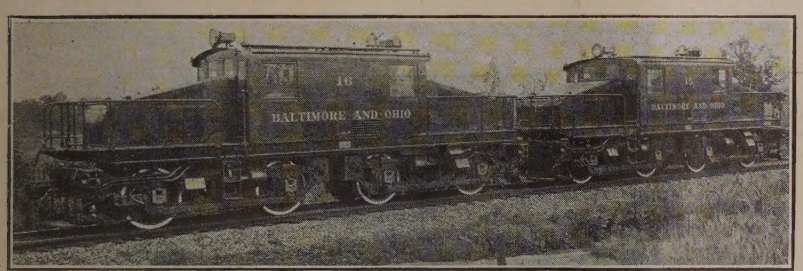
Two 120-ton 600-volt electric locomotives have recently been shipped by the General Electric Company for use in the Baltimore tunnel of the Baltimore & Ohio Railroad. They are of the steeple-cab type with with articulated trucks and each is equipped with G-E-209 motors. The length of the locomotives inside knuckles is 39 ft. 6 in., length over cab 33 ft. 6 in., height over cab 12 ft. 4 in., over-all width 10 ft. The operating cab is 15 ft. x 10 ft.

A feature of the construction is that buffing and hauling stresses are carried through the truck side frames and an articulated joint, thus entirely eliminating these strains from the cab and platform. Multiple-unit control and four third-rail shoes are provided.

These locomotives have been designed for a speed of 17 m.p.h. with train of 1,200 tons and 14 m.p.h. up a 0.5 grade. The tractive effort is 21,600 lb.

For the Toledo Edison Company, a swivel-truck type switching locomotive with a 750-ft. cable reel is being made. This will be equipped with multiple-unit control and combined straight and automatic air brakes.

A 50-ton 600/1,200-volt locomotive is under construction on order of the Portland Railway Light & Power Company for the Williamette Valley Southern Railway.



STEEPLE-CAB, ARTICULATED-TRUCK LOCOMOTIVES FOR B. & O. TUNNEL

Trade Associations Helpful

The trade association as a means for the promotion and self-regulation of industry has become an important American business institution, according to Herbert Hoover, Secretary of Commerce, under whose direction a book has recently been published on this subject. Generally speaking the public is little acquainted with its scope and activities. The constructive purposes of these organizations have unfortunately been confused with the minority of activities which have sometimes been used as a cloak for action against the public interest.

All trade association activities are not good, according to the Secretary, just as all individual habits are not good until so proved by their reaction on the individual and the community. The purpose and aim of a trade association is to deal with all questions of general application in the branch of industry or commerce it serves, and so to develop its field that the enterprises in it may be conducted with the greatest efficiency and economy. Among the outstanding examples of substantial constructive endeavor may be listed the preparation of statistics, simplification, standardization and the elimination of waste, industrial and commercial research.

Study of Oil Prices Carried Back Sixty-four Years

Interesting figures are given by the Atlantic Refining Company, Philadelphia, showing the average price of Pennsylvania crude oils per gallon at the wells for the last sixty-four years. The figures were obtained from a number of different sources and it is possible that some slight variation exists in the method of figuring the average price in different years. Several sharp fluctuations occurred during this period. Present consumers will view with regret the extremely low prices that prevailed for many years. There may be some slight satisfaction, however, to be found in the fact that the price today is slightly lower than it was a few years ago.

Year	Average Price	Year	Average Price
1859	$20	1891	$0.66
1860	9	1892	.55
1861	* .50	1893	.64
1862	1	1894	.83
1863	3	1895	1.22
1864	9.15	1896	1.19
1865	6.87	1897	.78
1866	3.59	1898	.91
1867	2.74	1899	1.29
1868	3.41	1900	1.35
1869	5.53	1901	1.21
1870	3.89	1902	1.23
1871	4.34	1903	1.59
1872	3.64	1904	1.62
1873	1.83	1905	1.39
1874	1.17	1906	1.59
1875	1.35	1907	1.74
1876	2.56	1908	1.78
1877	2.42	1909	1.64
1878	1.09	1910	1.33
1879	.85	1911	1.30
1880	.94	1912	1.60
1881	.85	1913	2.46
1882	* .85	1914	1.82
1883	1.05	1915	1.56
1884	.83	1916	2.50
1885	.88	1917	3.25
1886	.71	1918	3.97
1887	.66	1919	4.12
1888	.87	1920	5.96
1889	.94	1921	3.33
1890	.86	1922	* 3.25

* Estimate based on incomplete figures.

Metal, Coal and Material Prices

Metals—New York	July 24
Copper, electrolytic, cents per lb	14.625
Copper wire base, cents per lb	17.50
Lead, cents per lb	6 30
Zinc, cents per lb	6.46
Tin, Straits, cents per lb	39.625
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$5.625
Somerset mine run, Boston, net tons	2.625
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	1.675
Central, Ill., screenings, Chicago, net tons	1.45
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$7.00
Weatherproof wire base, N. Y., cents per lb.	18.75
Cement, Chicago net prices, without bags	$2.20
Linseed oil (5-bbl. lots), N. Y., per gal	$1.03
White lead, in oil (100-lb. keg), N. Y., cents per lb	11.85
Turpentine, (bbl. lots), N.Y., per gal	$0.98

Rolling Stock

Illinois Power Company, Springfield, Ill., has placed an order with Nic Le Grand, Inc., for seven "positive" safety equipments.

Dubuque Electric Company has given a contract to Nic Le Grand, Inc., to convert six cars to modern one-man cars with safety features.

South Carolina Gas & Electric Company, Spartanburg, S. C., has placed an order with the Bell-Brown Motor Company to furnish buses in Spartanburg following the order of the commission to suspend trolley service. The buses will each have a capacity of twenty-five passengers.

Hudson & Manhattan Railroad, New York, N. Y., has let a contract for twenty-five cars to the American Car & Foundry Company. The construction of these cars begins at Berwick this week. These cars are to be just like the twenty-five cars obtained in 1922 and the twenty-five cars obtained in 1921, making seventy-five cars ordered during the last three years.

Dallas Railway has just placed an order with the J. G. Brill Company for thirty double-truck Peter Witt type cars, the electrical equipment for each of which will consist of four G.E.-265 motors and G.E. C.P.-27 air compressors with standard safety features. The Dallas Railway recently reached a fare agreement with the city of Dallas as a result of which it agreed to purchase these new cars.

Track and Line

Paducah Electric Company expects to improve 19 miles of trackage at an expenditure of approximately $30,000.

Memphis Street Railway is relaying trackage on South Third Street in the vicinity of Union Avenue. Track improvements are being made in other parts of the city.

Pittsburgh Railways will spend $657,800 for repairing tracks and freight stations and for purchasing new motors and a grading shovel. Judge Gibson in the United States District Court recently approved the report of the special master allowing the receivers to spend this amount.

Lewistown & Reedsville Electric Railway, Lewistown, Pa., will improve its line by the making of a double-track system from Burnham Junction to Lewistown proper. A survey is now being conducted by engineers in the employ of Day & Zimmermann.

New York State Railways, Utica, N. Y., will construct a single-track service line along James Street in Utica, starting from the end of the present James Street line and running easterly to the intersection of St. Vincent and James Streets. The Public Service Commission has approved the improvement.

Seattle Municipal Railway will start work immediately on an undertaking which will cost $45,000. It involves the installation of a "grand central" at the north end of the Fremont bridges. The complicated network of trackage was turned out by the Bethlehem Steel Corporation. The installation of this piece of special work will require two months to complete.

Northern Texas Traction Company, Fort Worth, Tex., will spend more than $400,000 in track improvements and extensions in Fort Worth. The contract has been awarded to Stone & Webster, Inc., for paving and double tracking part of Forest Park Boulevard, a 3-mile extension to Riverside line and a 3 mile extension to Oakland division through Sycamore Heights to the city limits.

Department of Street Railway, Detroit, Mich., has advertised for a lot of drop-forged steel single-curve pullovers, and also for drop-forged steel double-curve pullovers. The carbon in these appliances is limited by the specifications to between 0.15 and 0.25 per cent. The forgings are to have a minimum strength of 60,000 lb. per square inch, and be galvanized according to the Department of Street Railway specifications 105021521, which corresponds to the American Electric Railway Engineering Associations' standard specifications of D f 2 b.

United Railways, St. Louis, Mo., will require a court order to extend the Natural Bridge line westward from its present terminus on Kings Highway to Pine Lawn to connect with the Kirkwood-Ferguson line. A petition to this effect has been filed with the United States Federal District Court by the city of St. Louis, North St. Louis Business Men's Association and the Natural Bridge Industrial District Association. The estimated cost of the extension is $175,000.

Charleston Interurban Railroad, Charleston, W. Va., will defer its plans to remove its rails from State Street and to lay a double track on Summers Street to the Lovell Street extension of Washington Street. City Manager Wise of Charleston ordered the plans held in abeyance because in his opinion the filling required when Lovell and Washington Streets were joined has not settled sufficiently to support the weight of street car traffic. The company is engaged in making numerous repairs to paving at various points in Charleston.

Springfield (Mass.) Street Railway has been granted a franchise to loop a single track through Broadway, Pynchon and Water Streets at the eastern end of Hampden County Memorial Bridge. A franchise had been granted previously for a double track through Vernon Street, to establish on outlet from the Bridge to Main Street, and this was approved by the State Public Utilities Commission June 20. Action on the Pynchon Street loop settles a prolonged controversy, and prompt action will be taken in the matter of establishing the designated connections.

Trade Notes

Commercial Indian Agency of Lahore, Punjab, India, is anxious for agency connections for any kind of machinery or other merchandise.

General Electric Company, Schenectady, N. Y., has received an order for fifty interurban car equipments from the Pacific Electric Company, Los Angeles, a Southern Pacific property. Four G.E.-240, 110-h.p. motors with P.C.-12 control will be furnished.

National Pneumatic Company, New York, N. Y., announces that A. Frank Paul, in charge of the company's office in Philadelphia, and Oscar A. Broten, Western representative in charge of the Chicago office, have been appointed direct assistants to the general sales manager and will aid in the supervision of all sales matter.

Sherwin-Williams Company, Cleveland, Ohio, recently announced that L. F. Mullen had accepted a position with its insulating materials department and had been appointed sales insulation engineer for the eastern district. Prior to July 1, Mr. Mullen was connected with the Westinghouse Electric & Manufacturing Company in the insulation section at East Pittsburgh and at St. Louis.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has supplied the Northern States Power Company with two new model extra long Westinghouse underfeed stokers for its St. Paul plant. These double-roll clinker grinder stokers have hollow forced draft agitating mechanisms which facilitate fuel-bed control and give active fuel-burning surfaces, non-clinkering extension sidewall tuyeres and large coal hoppers. The Alemite lubricating system is used on these stokers.

Boston Elevated Railway has placed an order with the Union Switch & Signal Company for a complete a.c. electro-pneumatic interlocking plant of fifteen levers, to be installed at the east end of the East Boston tunnel. This double-track tunnel has heretofore been operated with surface cars only, but it is now being changed over for multiple-unit trains, and seventy electro-pneumatic automatic stops have been ordered from the Union Company for this service. The construction work will be carried out by the signal department of the Boston Elevated Railway.

New Advertising Literature

Chausse Oil Burner Company, Detroit, has issued a circular describing its oil-burning tool and surface heaters for repairing asphalt pavements.

Ramapo Ajax Corporation, Hillburn, N. Y., has issued a sixty-four-page booklet concerning switches, frogs and special work of every description. Various "Racor" switches are illustrated.